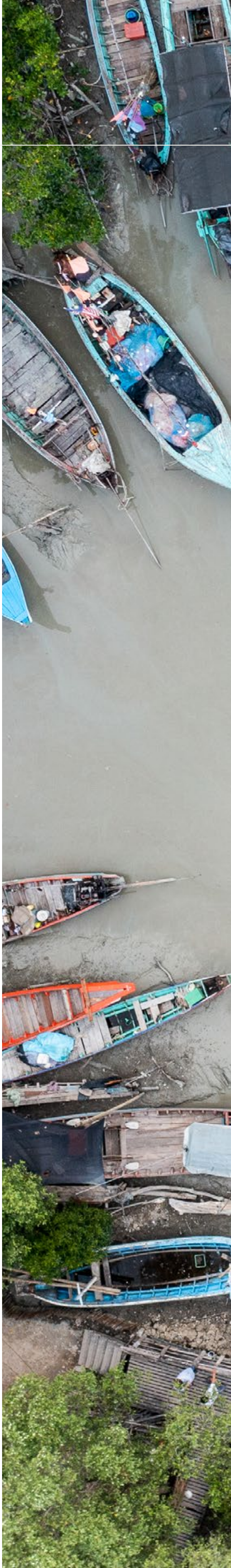
2023

A MANIFESTO FOR OUR OCEAN

ENVIRONMENTAL JUSTICE FOUNDATION

ACRONYMS AND ABBREVIATIONS

APIL	Advocates for Public Interest Law
CCZ	Clarion-Clipperton Zone
CMM	Conservation and management measure
EJF	Environmental Justice Foundation
FAO	Food and Agriculture Organization of the United Nations
FMFO	Fishmeal and fish oil
GDP	Gross domestic product
HDI	Human Development Index
IEZ	Inshore Exclusion Zone
ILO	International Labour Organization
IMO	International Maritime Organization
ISA	International Seabed Authority
IUCN	International Union for Conservation of Nature
IUU	Illegal, unreported and unregulated fishing
LMMA	Locally Managed Marine Area
MPA	Marine protected area
NDC(s)	Nationally Determined Contribution(s)
NGO	Non-governmental organisation
OECD	Organisation for Economic Co-operation and Development
PSMA	Port State Measures Agreement
RFMO	Regional Fisheries Management Organisation
SDG(s)	United Nations Sustainable Development Goal(s)
UN	United Nations
UNEA	United Nations Environment Assembly
UNGA	United Nations General Assembly
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WTO	World Trade Organization



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FOREWORD

OUR OCEAN IS THE BLUE BEATING HEART OF OUR PLANET.

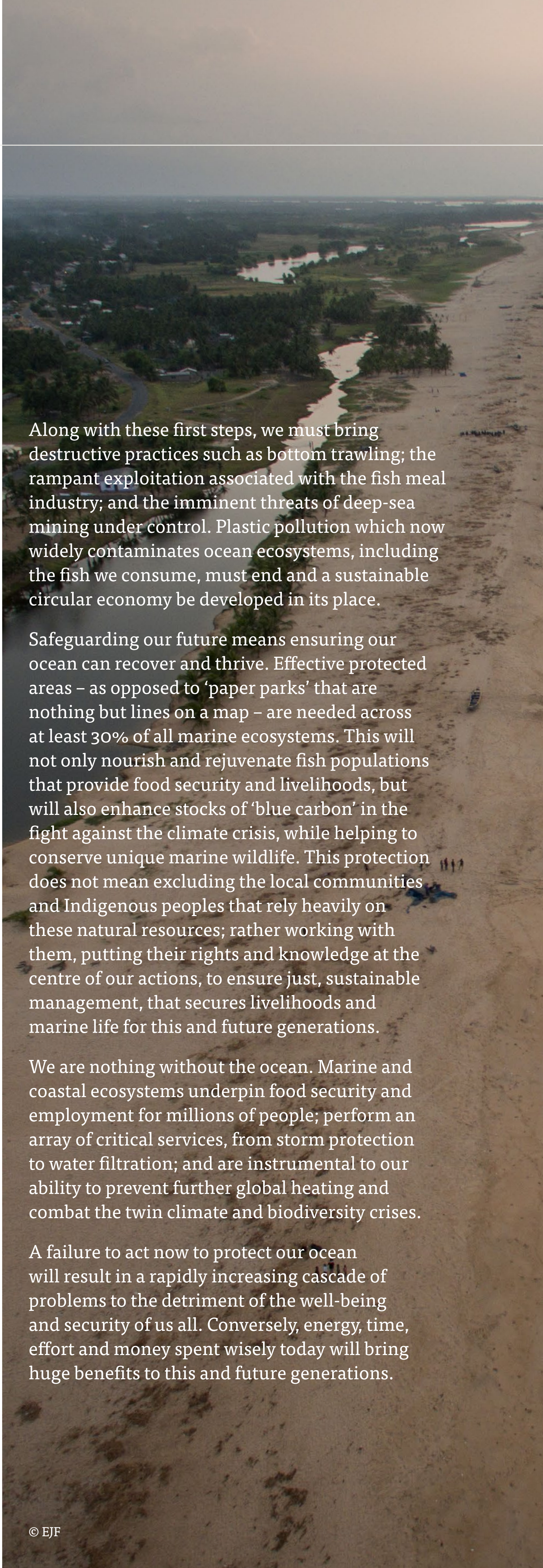
Over three billion people depend on food from the sea as a major source of protein,[1] and the seafood sector alone provides over 200 million jobs,[2] with the ocean directly contributing an estimated US$1.5 trillion to the global economy.[3] Our ocean also keeps our climate stable, absorbing around one-quarter of humanity's CO_2 emissions[4] and 90% of heat generated from excess greenhouse gas emissions,[5] all the while producing around half of the Earth's oxygen,[6] more than all of the world's forests.

However, we are putting this irreplaceable ecosystem under extreme pressure. Since industrial fishing began in the early 1950s, 90% of the world's large ocean fish – such as sharks, cod and swordfish – have been lost.[7] Over a third of the planet's fish populations are now overfished, according to the latest report from the UN Food and Agriculture Organization (FAO).[8] Alongside impacts on fish populations, countless other habitats are under threat: mangroves are being wiped out, coral reefs are bleaching and dying, and many whale populations are on the brink of extinction.

For too long, myopic corporate and government actors – driven by short-term financial or political gain – have continued to perpetuate the unsustainable behaviours that have brought about the ecological crisis facing marine life.

In this manifesto, we lay out a roadmap for the protection of the ocean, providing clear policy recommendations to save our seas and safeguard our future.

The global community can make great strides towards ending unsustainable and illegal fishing by eradicating harmful subsidies and ensuring transparency across the sector. Neither of these two crucial actions are particularly complex, nor are they unrealistically expensive. In fact, ending harmful subsidies would save billions of dollars of public money across the globe.



Along with these first steps, we must bring destructive practices such as bottom trawling; the rampant exploitation associated with the fish meal industry; and the imminent threats of deep-sea mining under control. Plastic pollution which now widely contaminates ocean ecosystems, including the fish we consume, must end and a sustainable circular economy be developed in its place.

Safeguarding our future means ensuring our ocean can recover and thrive. Effective protected areas – as opposed to 'paper parks' that are nothing but lines on a map – are needed across at least 30% of all marine ecosystems. This will not only nourish and rejuvenate fish populations that provide food security and livelihoods, but will also enhance stocks of 'blue carbon' in the fight against the climate crisis, while helping to conserve unique marine wildlife. This protection does not mean excluding the local communities and Indigenous peoples that rely heavily on these natural resources; rather working with them, putting their rights and knowledge at the centre of our actions, to ensure just, sustainable management, that secures livelihoods and marine life for this and future generations.

We are nothing without the ocean. Marine and coastal ecosystems underpin food security and employment for millions of people; perform an array of critical services, from storm protection to water filtration; and are instrumental to our ability to prevent further global heating and combat the twin climate and biodiversity crises.

A failure to act now to protect our ocean will result in a rapidly increasing cascade of problems to the detriment of the well-being and security of us all. Conversely, energy, time, effort and money spent wisely today will bring huge benefits to this and future generations.

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SUMMARY OF KEY RECOMMENDATIONS TO POLICY MAKERS

CONSERVING MARINE BIODIVERSITY – FOR NATURE, PEOPLE AND CLIMATE

1 Commit, as a minimum target, to the 30x30 ocean protection plan and designate at least 30% of the ocean – including national and coastal waters and the high seas – as ecologically representative fully or highly protected marine areas (MPAs) by 2030. Protected areas should incorporate the full range of ecosystem types, in recognition of the interdependent relationships between different coastal and marine ecosystems.

2 Provide the resources necessary to properly protect designated MPAs. Ensure that MPAs are monitored and fully enforced to prevent them from becoming 'paper parks' that provide no true protection to ocean ecosystems.

3 Work to formally adopt and ratify the UN High Seas Treaty as soon as possible and intensify international cooperation to secure its urgent and effective implementation, including the rapid designation of a comprehensive network of MPAs in areas beyond national jurisdiction with high standards of protection for marine biodiversity and ecosystems.

4 Lead with ambition to set binding, measurable biodiversity restoration and conservation targets at the national level, within the framework of the Convention on Biological Diversity and the Kunming-Montreal Global Biodiversity Framework, and to leverage technical and financial support for developing nations to meet such targets.

5 Integrate measures to ensure the effective protection of ocean ecosystems into all relevant updated Nationally Determined Contributions (NDCs) commitments, in recognition of the blue carbon and the climate control function of the ocean.

6 Significantly increase climate finance and provide support for climate finance mechanisms that recognise the responsibility of historic greenhouse gas emitters, with specific funding earmarked to support ocean protection/restoration, including community-led blue carbon restoration, nature-based solutions and ecosystem-based adaptation in developing countries.

7 Invest in scientific exploration and research of deep-sea environments to improve understanding of these ecosystems and the impacts of human activity in the deep sea, including the implications for carbon storage, global heating, biodiversity loss and global fisheries.

8 Advocate and take action to stop and prevent deep-sea mining, in line with the precautionary principle. Push for governance reform and stronger oversight of the deep-sea mining industry, including the reform of the International Seabed Authority (ISA) to ensure transparency and address conflicts of interest.

FAILURE TO ACT NOW TO PROTECT OUR OCEAN WILL RESULT IN A RAPIDLY INCREASING CASCADE OF PROBLEMS TO THE DETRIMENT OF THE WELL-BEING AND SECURITY OF US ALL.

PROTECTING HUMAN RIGHTS AND LIVELIHOODS

1. Ensure that all efforts to protect and restore the ocean are human rights-consistent, with the effective participation of local and Indigenous communities in decision-making processes. Carefully implement MPAs, ensuring they are co-designed and co-managed with local and Indigenous communities and that they protect both wildlife and people.

2. Ensure that when considering new activity in the ocean, the impacts on ecosystems and coastal communities are fully taken into account, to protect human rights and livelihoods as well as wildlife and biodiversity.

3. Establish, expand and strengthen inshore exclusion zones (IEZs) reserved for small-scale fishing activities to support and protect the livelihoods of coastal communities from the interference of industrial fishing and destructive fishing practices.

4. Ensure that foreign fishing access agreements, in particular in the waters of lower-income countries, are sustainable and equitable, making sure that marine ecosystems and food security are not compromised and that the rights and livelihoods of small-scale fishing communities are supported.

5. Prioritise the reduction of vulnerability of coastal communities through funding and national measures, building adaptive capacity and enhancing resilience to shocks and stresses caused by climate impacts.

6. Redirect funds gained through ending harmful fishing subsidies towards a just transition for fleets – such as bottom trawlers – to ensure viable alternative livelihood options for workers in the fishing industry.

ENDING PLASTIC POLLUTION

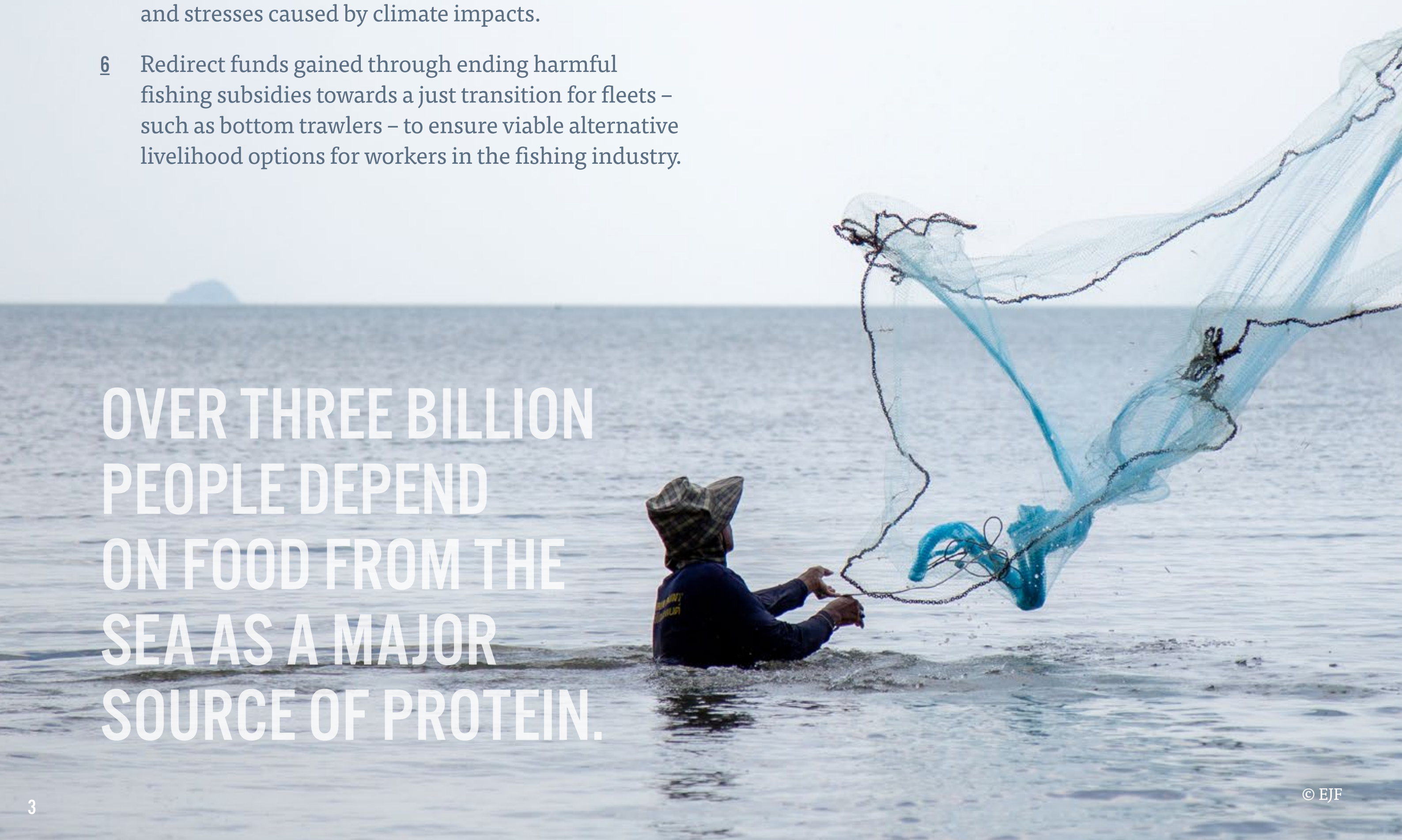
1. Support the establishment of a new, legally binding United Nations treaty on plastic pollution to prevent and remediate plastic pollution and its toxic impacts through measures across the entire plastics life cycle.

2. Implement policies to end the use of single-use plastic and require manufacturers to pay the full cost of dealing with plastic packaging once it becomes waste, creating an economic incentive to decrease production and drive improvements in plastic waste management. Hold plastic producers accountable for plastic pollution by requiring full transparency from companies on their plastic use, plastic pollution, and associated greenhouse gas emissions.

3. Increase regulation around the global practice of offshoring plastic waste from industrialised to middle or low-income countries, and prevent the movement of waste plastics to countries with insufficient waste management infrastructure.

4. Increase investment in the development of recycling technologies and non-plastic alternatives to accelerate the transition from linear to circular plastic production and consumption.

5. Adopt and implement a global agreement on ghost gear prevention, including mandatory gear marking guidelines and disposal regulations.



OVER THREE BILLION PEOPLE DEPEND ON FOOD FROM THE SEA AS A MAJOR SOURCE OF PROTEIN.

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ADDRESSING UNSUSTAINABLE AND ILLEGAL FISHING

1. Improve transparency in the fisheries sector as a whole by immediately and fully implementing the ten principles of the Global Charter for Transparency, including publishing key fisheries-related information on fishing vessels, beneficial ownership and infractions; mandating unique vessel identifiers (in the form of International Maritime Organization (IMO) numbers where eligible) for fishing vessels; making vessel tracking data public; and banning at-sea trans-shipment, unless carefully monitored.

2. Take concrete action to significantly reduce the global footprint of bottom trawling including, as a minimum, banning bottom trawling in all MPAs to protect and restore vulnerable ecosystems and species – supported by stringent monitoring and full, effective enforcement of regulations – coupled with the prohibition of bottom trawling from expanding into new, untrawled areas.

3. Implement the World Trade Organization (WTO) Agreement on Fisheries Subsidies and go beyond it by urgently reflecting its provisions in domestic regulations and removing all harmful subsidies, ensuring transparency throughout the process. Accelerate negotiations to expand the Agreement's remit and make it binding.

4. Include fuel subsidies and fishing overcapacity in regulatory frameworks and policies, and phase out fishing sector public subsidies, including fuel subsidies, that support fishing beyond sustainable catch levels and perpetuate the destruction of marine ecosystems.

5. Take concrete actions to end the use of flags of convenience in the fisheries sector, including requiring details on ownership arrangements when registering and licensing fishing vessels to ensure beneficial owners can be identified and held to account for any subsequent infractions, and ultimately, removing foreign-owned fishing vessels and fish carriers altogether from vessel registries.

6. Ensure that the authorities responsible for controlling fishing activities and trade flows in fisheries products are given the necessary resources, powers, tools and technologies – such as strong import control systems and, where appropriate, electronic monitoring – to fight illegal, unreported and unregulated (IUU) fishing and associated abuses.

7. Ensure that law enforcement authorities and the judiciary are adequately equipped, trained and screened for corruption to facilitate the prosecution and punishment of individuals and – where allowed by domestic law – corporations that support or engage in IUU fishing and associated abuses, based on clear and comprehensive legal frameworks. Punishments for illegal fishing and associated human and labour rights abuses must be deterrent, but should not disproportionately impact small-scale fishers.

8. Tackle the enablers of IUU fishing and human rights abuses, in particular corruption through, among other approaches, risk mitigation strategies that include preventive, law enforcement and transparency measures.

9. Adopt and implement robust legislation requiring industry to undertake mandatory due diligence to identify IUU fishing, human rights and labour risks in their supply chains, and establish full supply chain transparency from 'net to plate'.

10. Ratify and implement key international conventions aimed at ending illegal fishing and human rights abuses on fishing vessels, including the United Nations Port State Measures Agreement (PSMA), International Labour Organization (ILO) Work in Fishing Convention, and IMO Cape Town Agreement.

11. Strive towards the establishment of regional fisheries management organisations (RFMOs) or other regional arrangements for fisheries/regions falling outside of current RFMO remits, such as West Africa for small pelagic and demersal fish populations, and in the Atlantic and Indian Oceans for squids.

12. Phase out the capture of wild fish for fishmeal and fish oil (FMFO) by implementing laws and policies that prioritise the direct human consumption of whole fish from wild capture fisheries; ruling out the establishment of new fishmeal operations; and ending the licensing of targeted fishing activities for fishmeal and fish oil production.

13. Immediately halt the expansion of FMFO processing plants in regions where critically overfished fisheries are depended on for local food security and livelihoods, with support from international partners to sustainably rebuild fish populations.

01

ENVIRONMENTAL JUSTICE

THOSE WHO RELY ON THE OCEAN ARE FACING MYRIAD THREATS TO THEIR HUMAN RIGHTS

THE IMPACTS OF OVERFISHING AND OTHER THREATS ARE NOT DISTRIBUTED EQUALLY ACROSS THE GLOBE, WITH SMALL-SCALE FISHING COMMUNITIES AND LOWER INCOME NATIONS BEARING THE HEAVIEST BURDENS.

THE CRISIS IN OUR OCEAN – A GRAVE ENVIRONMENTAL INJUSTICE

Our ocean sustains and supports the human rights of over three billion people who rely on marine and coastal ecosystems for their livelihoods.[9] An estimated 120 million people are employed directly in the marine fisheries sector,[10] of which 97% live in the Global South[11] and 90% are employed in small-scale fisheries.[12] Small-scale fisheries account for at least 40% of the global catch[13] and produce almost half the fish consumed in low and middle-income countries,[14] where fish often provides a critical source of nutrition and micronutrients.[15] It is estimated that small-scale fisheries may support the lives and livelihoods of over 500 million people worldwide, both as a source of nutrition and income.[16,17]

Those who rely on the ocean are facing myriad threats to their human rights. The impacts of a heavily subsidised industrial fishing industry (see **Section 6**), exacerbated by illegal and destructive fishing practices (see **Sections 5 and 7**), the proliferation of fishmeal operations (see **Section 8**), and the effects of plastic pollution on marine wildlife (see **Section 10**), among other threats, have left many small-scale fishing communities in peril, facing impossible competition and dwindling fish populations. The latest estimates suggest that over one-third of global fisheries are currently overfished,[18] with economies losing tens of billions of dollars annually to illicit fishing practices. Global heating is acting as a threat multiplier, compounding existing economic, political, social and ecological stresses and inflicting harsh penalties on the poorest communities on our planet.[19]

The impacts of overfishing and other threats are not distributed equally across the globe, with small-scale fishing communities and lower income nations bearing the heaviest burdens.[20] Higher-income countries dominate industrial fishing in the waters of lower-income countries, accounting for 78% of trackable industrial fishing activities in those waters.[21] These distant water fleets are frequently implicated in overfishing, illegal fishing, and destructive practices, causing damage to the fishing gear of small-scale fishers and the marine ecosystems they depend on.[22,23] This is particularly evident in West Africa, where IUU fishing – dominated by foreign vessels – accounts for at least one-third of the total regional catch.[24] More than 80% of government fisheries subsidies benefit these large industrial fleets,[25] with subsidies for distant water fishing activities often worth as much as 20-40% of the total catch value.[26] A recent study found that 40% of harmful subsidies that support fishing in the waters of nations with a very low Human Development Index (HDI) originate from high-HDI and very high-HDI nations.[27] The expansion of fishmeal operations in countries such as Mauritania presents a major threat to regional food security and livelihoods; the industry diverts around one-fifth of global wild fish catches[28] – often critical species for local consumption – to the production of feed for high-value aquaculture species in the Global North. This assault on our ocean has fundamentally undermined the human rights of coastal dwellers and others reliant on fish for livelihoods and nutrition.[29]

ON THE FRONTLINES OF THE CLIMATE CRISIS

An estimated 37% of the global population live in coastal communities, with 10% living in areas less than 10 metres above sea level.[30] These communities sit on the frontlines of the climate crisis, facing rising sea levels, coastal erosion, ocean acidification and increasing sea temperatures – all of which exacerbate vulnerability to fisheries declines and further undermine livelihoods and food security. Tropical fisheries in particular are under acute stress, with the maximum catch potential of fish populations in the waters of some tropical countries heavily dependent on fisheries projected to decline by up to 40% by the 2050s under a 'business as usual' scenario.[31]

The impacts of the climate crisis are experienced to a greater extent in lower-income countries, and by those least responsible for global heating. By 2030, the climate crisis could push 132 million people into extreme poverty, with the highest numbers projected in Sub Saharan Africa and South Asia.[32] Land that is home to 300 million people could flood at least once a year by 2050 if emissions are not cut drastically.[33]

Coastal ecosystems, such as mangroves and seagrass meadows, are vital for the resilience of vulnerable communities to global heating impacts, providing a range of critical services, from protection against storm surges and coastal erosion, to water quality regulation, food security and livelihood opportunities. However, these valuable ecosystems are under threat – approximately 35% of mangroves[34] and 50% of coral reefs,[35] as well as 30% of seagrass meadows[36] have been lost or degraded over the past century. These declines have a disproportionate impact on populations who rely heavily on such ecosystems for the services they provide;[37] worryingly, "where people's needs for nature are now greatest, nature's ability to meet those needs is declining".[38]

PROTECTING THE HUMAN RIGHTS OF COASTAL COMMUNITIES

The impacts of fisheries declines, climate breakdown, biodiversity loss and marine pollution are creating severe environmental injustices that threaten the human rights of coastal populations.[39]

Urgent, concerted action is needed to address these multidimensional threats and stem the twin ecological and climate crises impacting our ocean. In pursuing these goals, all actions should seek to protect and promote fundamental human rights,[40] including the right to a healthy environment (see **Box 1**), livelihoods and adequate food, and address the power imbalances that result in the marginalisation of communities impacted by these injustices.[41] Critically, the international community must ensure those directly affected by environmental injustices have access to justice through accessible and effective processes and remediation mechanisms.[42]

BOX 1: THE RIGHT TO A HEALTHY ENVIRONMENT – A UNIVERSAL HUMAN RIGHT

In July 2022, the United Nations General Assembly adopted a resolution[43] declaring that everyone on the planet has the right to a clean, healthy and sustainable environment. The resolution recognises that environmental degradation, climate change and biodiversity loss are among the most pressing and serious threats to the enjoyment of all human rights, and calls on states, international organisations, businesses and other stakeholders to scale up efforts to ensure a clean, healthy and sustainable environment for all. This follows a 2021 resolution of the UN Human Rights Council (UNHRC)[44] that recognised access to a healthy and sustainable environment as a universal right. Far from being merely aspirational, the right to a healthy environment has long been recognised and enforced by a large number of states[45] and there is increasing support for its recognition as a norm of customary international law.[46] It is vital that these developments are now enshrined in national constitutions and regional treaties, and subsequently implemented, to provide a basis for impacted communities to challenge environmentally destructive policies and projects.[47]

THE CRITICAL IMPORTANCE OF PARTICIPATORY DECISION-MAKING

Participation of local communities is key.[48] Small-scale fishers are often marginalised in fisheries management; women fish workers, in particular, are rarely represented in decision-making processes despite making up around 40% of the small-scale fishery workforce.[49] Yet these communities constitute the backbone of global fisheries, often holding the deepest relations to, and knowledge of, marine ecosystems, having existed side-by-side with the ocean sustainably for generations.

Efforts to conserve marine and coastal ecosystems, such as the designation of MPAs that are implemented without consultation and effective participation of local resource users, risk further undermining human rights, particularly where areas are culturally and economically important to communities. Participatory and inclusive decision-making processes – as enshrined in the Aarhus Convention,[50] the leading international agreement on environmental democracy, and emphasised in the FAO's Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries – are not only critical to addressing injustices and the realisation of human rights, but have been shown to improve sustainability and development outcomes.[51]

BOX 2: THE DASE APP FOR REPORTING ON ILLEGAL FISHING

Destructive fishing practices, such as bottom trawling, are not permitted within certain areas of the ocean, such as marine protected areas (MPAs) and inshore exclusion zones (IEZs) reserved for small-scale fishers. However, these practices all too frequently continue illegally, facilitated by the opaque nature of activities at sea, causing destruction to marine ecosystems, undermining local livelihoods and presenting a threat to small-scale fishers operating in these areas.

In response to this problem, EJF has launched the 'DASE' app in West Africa – translating to 'evidence' in the Ghanaian dialect Fante – which allows small-scale fishing communities to engage in participatory surveillance and capture evidence of illegal fishing activity. When a vessel is spotted fishing illegally, or damaging canoes or fishing gear, the user simply opens the app and takes a photo of the vessel with its name or identification number showing, and records the location.

The app does the rest, uploading the report to a central database where the evidence can be used by the authorities to catch and sanction the perpetrators.

The app has been designed in a way that is user-friendly for small-scale fishers and local authorities – it uploads evidence later if there is no internet available at sea, it requires little storage space, and waterproof pouches are provided to protect phones. It can also help to resolve conflicts between different fishery stakeholders by providing concrete evidence of infractions. This app has been launched across West Africa in Ghana, Liberia and Senegal with the aim of helping communities to rid their waters of the illegal vessels that threaten their livelihoods and food security.

TOWARDS A MORE SUSTAINABLE AND EQUITABLE FUTURE FOR ALL

A roadmap to a more equitable world for all already exists: the Sustainable Development Goals[52] (SDGs) – which are themselves grounded in human rights[53] – have been studied, scrutinised, and in many ways most importantly, agreed to by nations globally. The SDGs include specific goals on the ocean including: the sustainable management and protection of marine ecosystems (Target 14.2); ending overfishing, IUU fishing and destructive fishing practices (Target 14.4); providing access for small-scale fisheries to marine resources and markets (Target 14.b); and enhancing conservation and sustainable use of the ocean through implementation of international law (Target 14.c). Achieving the SDGs will be key to a more just and sustainable future for all.

This Manifesto for Our Ocean, read together with EJF's Manifesto to Combat Global Heating,[54] aims to point the way and highlight what can and should be done to achieve a sustainable, survivable future. Recommendations to protect and restore blue carbon and other coastal ecosystems (**Sections 2 and 3**); implement ocean protection measures (**Section 4**); end unsustainable and illegal fishing (**Section 5**); address harmful fisheries subsidies (**Section 6**) and destructive practices such as bottom trawling (**Section 7**); reform the unjust and wasteful fishmeal industry (**Section 8**); stop deep-sea mining (**Section 9**); and stem the flow of plastics into our ocean (**Section 10**), are provided in the following sections.


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02

BLUE CARBON

THE CARBON STORED IN COASTAL AND MARINE ECOSYSTEMS IS CALLED 'BLUE CARBON'

THE OCEAN IS THE WORLD'S LARGEST ACTIVE CARBON SINK, ABSORBING AROUND ONE QUARTER OF THE ATMOSPHERIC CO2 EMITTED BY HUMAN ACTIVITIES.

THE OCEAN: CHAMPION FOR CLIMATE MITIGATION AND ADAPTATION

Protecting and restoring ocean ecosystems is critical in the fight against climate breakdown, while providing innumerable adaptation benefits for communities on the frontlines of the climate crisis. The ocean is the world's largest active carbon sink,[55] absorbing around one quarter of the atmospheric CO_2 emitted by human activities.[56] Some 680 million people live in low-lying coastal zones,[57] where thriving marine-vegetated ecosystems such as mangroves provide a defence against storm surges and rising sea levels, and other climate-related threats.

The carbon stored in coastal and marine ecosystems is called 'blue carbon'.[58] Marine vegetated habitats rich in blue carbon – such as mangroves, seagrass meadows, intertidal salt marshes, and macroalgae such as kelp – cover just 0.2% of the ocean surface, yet contribute 50% of carbon sequestered in marine sediments.[59]

Carbon stored below the ground in vegetated marine habitats can be up to 1000 tonnes per hectare, considerably higher than most terrestrial ecosystems.[60]

Blue carbon ecosystems play a critical role in limiting global heating. They capture carbon at several times the rate of tropical forests (Table 1),[61] storing it for decades to millennia if left undisturbed. If properly restored and protected, coastal blue carbon ecosystems could alone sequester up to 200 million tonnes (2%) of the CO_2 humans are currently emitting every year.[62] They also perform a multitude of other functions, providing habitats for many species, supporting healthy fisheries, improving water quality, and providing vital protection against floods and storms.

Carbon is also sequestered by the 'powerhouses' of the ocean: phytoplankton, which contribute up to 45% of the planet's net photosynthetic assimilation of CO_2.[63] The carbon stored by phytoplankton then enters the marine food chain and is eventually buried in the sediment as dead organisms sink to the seafloor. The seafloor stores enormous quantities of carbon: approximately 2.3 trillion tonnes in the top metre, almost twice as much as the top metre of all terrestrial soils.[64]

ECOSYSTEMS IN PERIL

However, these precious ecosystems are being lost and degraded, threatening the release of huge quantities of stored carbon into the atmosphere,[65] estimated at up to one billion tonnes of CO_2 annually.[66] This is equivalent to around 19% of global deforestation emissions, causing economic damage of up to US$42 billion each year.[67] Seafloor sediments are also being degraded, with activities such as bottom trawling (**Section 7**) and deep-sea mining (**Section 9**) threatening the integrity of this critical carbon store.

TABLE 1: COMPARING THE POWER OF MAJOR CARBON SINKS (ALL FIGURES ARE ESTIMATES)

ECOSYSTEM	GLOBAL COVERAGE (KM2)	SEQUESTRATION RATE PER KM2 PER YEAR
TROPICAL FORESTS	18,341,360[68]	63 TONNES[69]
MANGROVES	147,860[70]	174 TONNES[71]
SEAGRASS MEADOWS	160,387[72]	54 TONNES[73]
SALT MARSHES	54,951[74]	218 TONNES[75]
KELP FORESTS	1,469,900[76]	303 TONNES[77] *FIGURE BASED ON SEQUESTRATION RATE OF ALL MACROALGAE SPECIES

COASTAL 'SEA FORESTS'

MANGROVES

Mangroves are salt-tolerant trees and bushes that grow along the coastline of tropical and subtropical countries. Mangrove forests can store up to four times more carbon per hectare than terrestrial tropical rainforest,[78] accounting for 10-15% of global carbon sequestration[79] and providing irreplaceable ecosystem services such as food security and storm protection for an estimated 100 million people (see **Section 3**).[80]

Mangrove forests support a wide range of biodiversity including manatees and dugongs, as well as numerous insect, reptile, mammal and bird species, such as the endangered Bengal Tiger[81] in the Sundarban forest of India and Bangladesh.[82] Submerged roots are littered with sponges, algae and other invertebrates.[83] Mangroves act as breeding and nursery grounds, providing shelter and food for juvenile fish and thereby supporting the health of fisheries worldwide.[84,85] In the Caribbean, for example, the biomass of several commercially important species significantly increases when adult habitat is connected to mangroves.[86]

Like other trees, mangroves absorb carbon dioxide from the atmosphere through their leaves, roots and branches. Unlike 'green carbon', however, mangroves store the majority of the carbon they sequester in the soil and sediment, where it is stored highly efficiently over, potentially, millennia. As a result, mangroves are among the most carbon-rich forests in the tropics.[87]

Global mangrove cover is estimated to have declined by up to 35% since 1980, mostly due to land conversion for coastal development, agriculture and aquaculture including shrimp farming (see **Section 8**), as well as deforestation for wood and charcoal.[88,89,90] Such trends severely undermine efforts to tackle the climate crisis – the destruction of mangroves generates around 10% of total global emissions from deforestation, despite making up only 0.4% of forests worldwide.[91]

Rates of mangrove loss are shown to be slowing, currently standing at around 0.15% per year.[92] However, this follows a longer period of extensive loss – an average of 6.6% between 1990 and 2020.[93] If sea levels are permitted to rise by 6 millimetres or more per year, mangroves are in danger of dying out along tropical coastlines by the year 2050.[94]

SEAGRASSES

Seagrasses are marine flowering plants found submerged under shallow coastal waters in intertidal and subtidal areas, occurring in both tropical and temperate seas and forming dense, biodiverse underwater meadows. Not only are seagrasses highly effective carbon sinks, they are among the most productive ecosystems in the world, performing important ecosystem functions for a diversity of species comparable to that of coral reefs.

Although covering just 0.1% of the ocean's surface,[95] seagrass meadows are responsible for up to 18% of the total amount of carbon that is sequestered by the oceans each year.[96] Capable of absorbing 27.4 million

tonnes of CO_2 per year, scientists estimate that the world's seagrass meadows may store up to 19.9 billion tonnes of carbon; twice the amount stored by forests.[97]

This sequestering efficiency is due largely to the capacity of seagrass meadows to store carbon in the seabed.[98] Seagrasses absorb carbon during their life cycle, which is then trapped and stored in oxygen-depleted marine sediment when they die.[99] This will remain buried for as long as the seabed is left undisturbed – potentially hundreds of years.

Seagrass meadows are critical for biodiversity, supporting a vast array of marine species and playing an essential role in global fisheries. An estimated 20% of the world's largest 25 fisheries depend on seagrasses at some point in their life cycle,[100] using these underwater meadows as breeding and nursery grounds. Thousands of species rely on seagrass meadows for food and shelter, including fish, shellfish and endangered and charismatic species, such as dugongs, seahorses and sea turtles.[101]

In spite of their importance, these vital carbon sinks are being degraded at an alarming rate – over 30% of seagrass species are now in decline,[102] threatened by destructive fishing practices (see **Section 7**), agricultural and industrial run-off, coastal development and global heating. Every seagrass meadow destroyed significantly undermines our ability to tackle the climate crisis. One study estimates the release of 300 million tonnes of carbon per year due to seagrass loss alone[103] – over eight times the annual CO_2 emissions of Switzerland.[104]

KELP FORESTS

Underwater kelp forests inhabit 22% of the world's coastlines, covering an estimated 1.5 million square kilometres[105] – an area around four times the size of Germany. Kelp are fast-growing, large brown macroalgae that grow in dense clusters – similar to terrestrial forests – in cool waters close to the shore. In ideal conditions, kelp can grow 18 inches (~46cm) per day and are capable of reaching 30 metres in length, creating vast canopies that tower high above the ocean floor.

Like other blue carbon ecosystems, kelp forests are home to abundant biodiversity, including sea otters, seals, whales and fish, as well as invertebrates and algae.[106] Kelps provide food and refuge for numerous species, playing an important role in global fisheries by protecting juvenile fish from predators.

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NOAA

GLOBAL MANGROVE COVER IS ESTIMATED TO HAVE DECLINED BY UP TO 35% SINCE 1980.

Kelp forests are extraordinarily effective carbon sinks, sequestering up to 173 million tonnes of carbon dioxide per year.[107] For example, kelp across the Great Southern Reef in Australia store more than 1.3 million tonnes of carbon annually, accounting for 30% of all blue carbon stored around the Australian continent.[108]

Around 90% of carbon sequestered by kelp occurs through transportation to the deep sea.[109] Kelp have a 'gas bladder' or 'float', that causes them to rise to the ocean's surface when they die and travel further out into the ocean. When this bladder pops, the kelp sinks down into the depths of the deep sea, where it decomposes in sediment and can be stored for millennia.

However, this process is being impacted by global heating. Rising sea temperatures accelerate the decomposition of kelp, preventing dead material from reaching deep sea carbon sinks. Estimates predict a 0.4°C increase in sea temperature could result in a 9% reduction in carbon sequestration capacity.[110] Ocean acidification, caused by CO_2 dissolved in seawater, causes kelp to display disease-like symptoms and die.[111] These climate-induced threats, combined with the impacts of invasive species, pollution, destructive fishing practices and overharvesting, mean that kelp forests are depleting at a rate of 2% per year.[112]

BOX 3: INTERCONNECTED MARINE ECOSYSTEMS

Ecosystems do not exist in a vacuum. They overlap and interact; damage to one risks degrading another, and efforts to protect and restore blue carbon must take this into account. This is especially true for mangroves, seagrasses and coral reefs, which support each other in unique ways.

Whilst not considered sources of blue carbon, coral reefs play an important role in the ocean's stability as a carbon sink through a symbiotic relationship with seagrasses and mangroves.[113] Coral reefs provide considerable protection, capable of absorbing 97% of wave energy[114] and protecting seagrasses and mangroves from storms and coastal erosion. The existence of seagrass meadows in shallow tropical marine areas depends on the degree to which coral reefs reduce wave energy.[115]

This protection is enhanced further by the presence of seagrass meadows, which provide a buffer between waves and mangrove areas.[116] In return, mangroves regulate the amount of sediment that reaches both seagrasses and coral reefs, preventing particles from blocking the sunlight these ecosystems need for photosynthesis. Mangroves in the Caribbean have been found to strongly influence the community structure of fish on neighbouring coral reefs, more than doubling the biomass of several commercially important species.[117]

Mangroves and seagrass live side-by-side in Raja Ampat, Indonesia.
The Ocean Agency / Ocean Image Bank

Degradation to one of these critical coastal ecosystems risks damaging another; efforts to protect and restore blue carbon must address harms to each of these interconnected habitats to be effective.[118]

SALT MARSHES

Salt marshes are coastal wetlands inhabiting intertidal areas that are flooded with salt water and drained by ocean tides. Salt marshes are estimated to cover over 90,800 square km of the Earth's surface[119] – an area roughly three times the size of Belgium.

At the meeting point of marine and terrestrial ecosystems, salt marshes offer unique landscapes home to rich wildlife. There are over 500 known species of salt marsh plants,[120] with species of migratory birds, seabirds and waders, as well as worms, shellfish and fish, relying on these ecosystems for food, shelter from predators and as breeding grounds, including species of commercial value.[121]

Salt marshes are capable of sequestering vast amounts of carbon – approximately 2.1 tonnes per hectare per year,[122] almost three times greater than the carbon sequestration capacity of tropical forests.[123] These coastal ecosystems trap and bury carbon through the build-up of sediment and vegetation, stored in soil largely composed of deep mud and peat that contains low levels of oxygen.

Like other blue carbon ecosystems, salt marshes are under threat. Vast areas have been drained and converted to agriculture, urban and industrial land.[124] Global heating and rising sea levels are expected to result in inundation, erosion and seawater intrusion into salt marshes.[125] Around 50% of all natural coastal wetlands, including salt marshes, have been lost or degraded since 1900,[126] and a further 30-40% may be lost over the next century under the current emissions trajectory.[127]


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CETACEANS: OUR UNDERWATER ALLIES FOR CLIMATE ACTION

It is not just ecosystems that are important sources of blue carbon; charismatic marine wildlife such as whales are now recognised as allies in the fight against climate breakdown, capable of storing vast amounts of carbon in their bodies and playing a vital role in the carbon cycle of our ocean.

Like all living beings, these species absorb carbon in their bodies throughout their lifetime. A great whale, for example, sequesters an estimated 33 tonnes of CO_2, which is stored for millennia when it dies and sinks to the seafloor.[128] However, their potential for carbon sequestration has been considerably diminished, due to the impact of unsustainable whaling and fishing activities.[129] Research estimates that whaling added over 23 million tonnes of carbon to the atmosphere from 1900 to 2000.[130] According to one study, rebuilding the populations of eight species (groups) of baleen whales[131] would store 8.7 million tonnes of carbon, equivalent to 110,000 hectares of forest.[132]

Cetaceans are also critical for the maintenance of healthy phytoplankton populations, which are, in turn, central to oceanic carbon sequestration. Phytoplankton fix carbon from the atmosphere and sequester it into the ocean – the driving force in a process called the 'biological carbon pump' that takes place throughout the ocean.[133] They depend on nutrients and minerals from whale faeces, such as iron and nitrogen. Many cetaceans also feed at lower depths of the ocean, transporting nutrients to phytoplankton as they rise to the surface in what is known as the 'whale pump'.[134] When whales migrate to low latitude areas – referred to as the 'whale conveyor belt' – they circulate these nutrients to nutrient-poor regions.[135] However, as the ocean changes under the impacts of global heating, the health, abundance and distribution of phytoplankton populations are threatened by ocean temperature changes, acidification, and shifts in currents and nutrient concentrations.[136,137]

PRIORITISING BLUE CARBON CONSERVATION

The significant carbon sequestration capacity of marine and coastal ecosystems, and their wildlife, demonstrates how biodiversity conservation and climate mitigation are inextricably linked. As such, legally binding, measurable and ambitious ocean protection targets should be incorporated as an inherent part of climate policies. Policies and practice should acknowledge and represent the experience and knowledge of local communities, and provide for their true participation in ocean and climate action.

Our ocean is one of our biggest allies in the fight against global heating, but we are running out of time to protect it. We need bold, visionary action from the global community of states that will conserve marine and coastal ecosystems, the rich biodiversity they contain, and protect the human rights of people around the world who depend on a healthy ocean for their livelihoods.

RECOMMENDATIONS:

- Commit, as a minimum target, to the 30x30 ocean protection plan and designate at least 30% of the high seas as ecologically representative fully or highly protected MPAs by 2030 (see **Section 4**). States must further commit to protecting 30% of national and coastal waters, with consideration given to the interconnectedness of blue carbon ecosystems, and provide the resources necessary to fully protect designated MPAs (see **Section 3**).
- Integrate measures to ensure the effective protection of ocean ecosystems into all relevant updated Nationally Determined Contributions (NDCs) commitments, in recognition of the blue carbon and the climate control function of the ocean.
- Lead with ambition to set binding, measurable biodiversity restoration and conservation targets at the national level, within the framework of the Convention on Biological Diversity and the Kunming-Montreal Global Biodiversity Framework, and to leverage technical and financial support for developing nations to meet such targets.
- Work to formally adopt and ratify the UN High Seas Treaty as soon as possible and intensify international cooperation to secure its urgent and effective implementation, including the rapid designation of a comprehensive network of MPAs in areas beyond national jurisdiction with high standards of protection for marine biodiversity and ecosystems (see **Section 4**).
- Significantly increase climate finance and provide support for climate finance mechanisms that recognise the responsibility of historic greenhouse gas emitters, with specific funding earmarked to support ocean protection/restoration, including community-led blue carbon restoration, nature-based solutions and ecosystem-based adaptation in developing countries.
- Advocate and take action to stop and prevent deep-sea mining, in line with the precautionary principle, and push for governance reform and stronger oversight of the deep-sea mining industry (**Section 9**).
- Ban destructive fishing practices such as dredging or bottom trawling in marine protected areas (**Section 7**), and phase out fishing sector public subsidies (**Section 6**), including fuel subsidies, that perpetuate the destruction of marine ecosystems.

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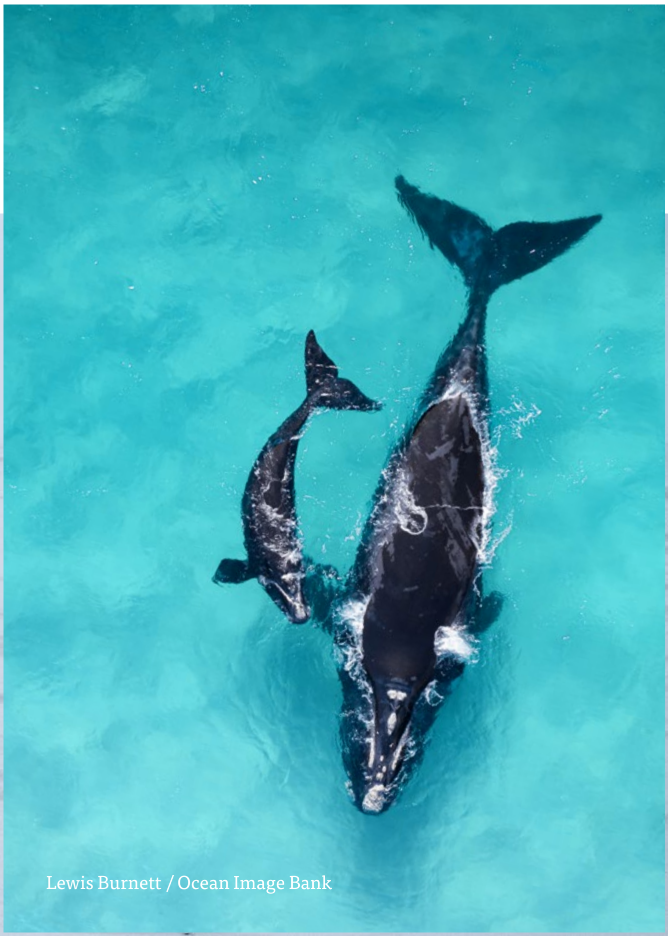

Lewis Burnett / Ocean Image Bank

03

COASTAL ECOSYSTEMS

SUPPORTING COASTAL COMMUNITIES

ACROSS 59 SUBTROPICAL COUNTRIES, MANGROVES ARE ESTIMATED TO REDUCE RISK TO OVER 15 MILLION PEOPLE AND PREVENT MORE THAN US$65 BILLION IN DAMAGES ANNUALLY.

Coastal ecosystems are critical allies in the fight against global heating. They also support, sustain and protect billions of people living in coastal zones across the world. Conserving and restoring these ecosystems means protecting the human rights of those living side-by-side with our ocean, who rely on it for their food and livelihoods.

PROTECTION AGAINST COASTAL HAZARDS AND EROSION

Coastal ecosystems offer a critical defence against erosion linked to rising sea levels.[138] Mangroves bind and trap sediment in their root networks, slowing the flow of water and preventing land from being lost to the sea.[139] Salt marshes act as buffer zones against storm surges and related erosion, reducing the height of waves by around 18%.[140] Seagrass is also highly effective at stabilising sediment and protecting against the erosion of tropical beaches.[141]

These ecosystems also play a role in adaptation to sea level rise through adding new land to coasts. In salt marshes, new soil is formed when silt builds up during floods and when vegetation decays. When mangroves trap sediment in their root systems, the surrounding land grows vertically by around 1-10 millimetres each year.[142]

Capable of absorbing 70-90% of wave energy,[143] mangroves provide remarkably effective protection to coastal communities from storms, tsunamis and floods. A comparison of two Sri Lankan villages hit by the devastating 2004 tsunami found that the village protected by mangroves only suffered two deaths, whilst the exposed village suffered 6,000.[144,145]

Across 59 subtropical countries, mangroves are estimated to reduce risk to over 15 million people and prevent more than US$65 billion in damages annually.[146] Their loss, according to the same research, would see the impacts of coastal hazards on land and people both increase by almost one-third each year.[147] Yet mangroves and other coastal ecosystems are being lost at an alarming rate (**Section 2**), putting coastal communities at greater risk of potentially devastating hazards.

BOX 4: BEYOND ECOSYSTEM SERVICES

The importance of coastal ecosystems is frequently measured by the economic value of the services they provide,[148] such as their role in supporting fisheries or the damages they prevent due to storm protection. Globally, the ecosystem value of seagrass meadows is estimated at US$19,004/ha/year, three times more than coral reefs and ten times more than tropical forests, making seagrass meadows one of the most valuable ecosystems on Earth in terms of the goods and services they provide.

Whilst these economic benefits provide a compelling argument for protecting and restoring coastal ecosystems, it is vital to recognise that ecosystems also offer benefits that cannot merely be assigned an economic value. Over 1,900 Indigenous communities live along coastlines across the world, representing around 27 million people.[149] To these communities, coastal ecosystems are deeply intertwined with their traditions and cultural heritage,[150] embodying an intrinsic worth that cannot be assigned a monetary value. Effectively irreplaceable, the degradation of these ecosystems must be prevented, and their inherent value to communities recognised in all protection and restoration efforts.

SUSTAINING COASTAL LIFE AND LIVELIHOODS

Marine and coastal ecosystems – the services they provide and the biodiversity they support – underpin coastal livelihoods, particularly small-scale fisheries. Around 7% of the global population relies on small-scale fisheries, including workers and their dependents, overwhelmingly in the Global South.[151] Of those engaged in primary production, the highest numbers of workers are located in Asia (85%), followed by Africa (9%).[152] Women make up the majority of workers in secondary marine-related activities[153] – when post-harvest operations are included, it is estimated that one in two workers in the sector is a woman.[154] Globally, aquatic foods make up an estimated 20% of average per capita animal protein intake for 3.3 billion people.[155] This figure is even higher in countries such as Bangladesh, Cambodia, and the Gambia, and in several small island states, where fish provides 50% or more of protein intake.[156]

Mangroves, seagrasses and other coastal ecosystems sustain these coastal fisheries, providing habitat, shelter from predators and food sources, and serving as breeding, spawning and nursery grounds for commercially valuable species. These habitats are also home to a wide array of biodiversity that supports the delicate balance of marine ecosystems and their associated fisheries.

An estimated 210 million people live in low-lying areas within 10 kilometres of mangroves, many of whom benefit from mangrove-associated fisheries.[157] Most mangrove-associated fishers are thought to be concentrated in Indonesia, India, Bangladesh, Myanmar, and Brazil.[158] The exact value of mangroves to these fisheries is site-specific – one study found the Mantang mangrove forest in West Malaysia supports fisheries worth US$100 million per year.[159] Meanwhile, an estimated 20% of the world's largest 25 fisheries depend on seagrasses at some point in their life cycle.[160] In the Gulf of Gabès region of Tunisia, degradation of seagrass meadows resulted in an estimated economic loss to coastal fisheries of approximately €750 million between 1990 and 2014.[161]

Beyond fisheries, coastal ecosystems provide a wealth of other resources that can support livelihoods in the longer term when exploited sustainably – mangroves, for example, provide wood, charcoal, and compounds for tanning animal skins.[162] Tourism supported by these diverse, rich landscapes is a vital source of income for coastal populations, a sector that contributes up to 40% of GDP for some small island states.[163]

Other contributions to human health and well-being include the supply of medicines – kelp, for example, possesses antimicrobial properties, which could be used for the creation of antibiotics or anticancer drugs[164] – and improvement of water quality. Salt marshes, mangroves and seagrasses filter, cycle and store nutrients and pollutants,[165,166] and prevent seawater from encroaching on inland waterways. They also protect fish and other marine species from pathogens and disease by filtering bacteria; seagrasses, for example, have been found to reduce the incidence of pathogenic marine bacteria in seawater by 50%,[167] in turn reducing disease in coral reefs and the contamination of seafood.[168]

BOX 5: CORAL REEFS

Coral reefs, despite playing a crucial role in oceanic climate and ecological stability, are not considered as blue carbon ecosystems because the amount of carbon they sequester is less significant. However, these colourful and varied landscapes perform a number of other critical functions for coastal communities.

One of the richest ecosystems on the planet, coral reefs support an estimated quarter of all marine species, rivalling rainforests in terms of biodiversity, despite accounting for just 0.1% of the ocean's surface area.[169] These complex ecosystems are habitats for hard and soft corals, sponges, crustaceans, molluscs, fish, sea turtles, sharks, dolphins and much more.[170] Coral reefs are indispensable to the stability and functioning of coastal ecosystems and the resilience of coastal populations.

Coral reefs are a vital source of food and income for coastal communities, contributing to a quarter of annual fish catch for developing countries and providing food to over one billion people in Asia alone.[171] Reef tourism is an important part of the coastal economy, particularly for small island states. Globally, at least 275 million people depend on reefs for their livelihoods and sustenance.[172]

Coral reefs are estimated to account for US$2.7 trillion per year in ecosystem service value,[173] although this is likely to be an underestimate, failing to account for the protection that coral reefs provide to houses, infrastructure and agricultural land. A healthy reef system can absorb 97% of wave energy,[174] forming a natural barrier against storms and flooding, and reducing the cost of expensive man-made defences.

Worryingly, we are rapidly losing these precious ecosystems – 50% have already disappeared,[175] and the IPCC predicts that nearly all corals will be wiped out by 2100 if global heating reaches 2°C,[176] along with the valuable goods and services they provide.


Credit: Alex Mustard / Ocean Image Bank

RECOMMENDATIONS

- Implement policies to protect and restore the ocean, including but not limited to sources of blue carbon, and in recognition of the interdependent relationships between different coastal and marine ecosystems.
- Prioritise the reduction of vulnerability of coastal communities through funding and national measures, building adaptive capacity and enhancing resilience to shocks and stresses caused by climate impacts.
- Strengthen international cooperation to end IUU fishing, and reduce the impacts of other destructive fishing practices like bottom trawling.
- Ensure that when considering new activity in the ocean, that the impacts on ecosystems and coastal communities are fully taken into account, to protect human rights and livelihoods as well as wildlife and biodiversity.
- Establish, expand and strengthen IEZs reserved for small-scale fishing activities to support and protect the livelihoods of coastal communities from the interference of industrial fishing and destructive fishing practices.

04

OCEAN PROTECTION

THE OCEAN SUSTAINS LIFE ON EARTH
YET ONLY 8% IS PROTECTED

ALMOST THE ENTIRE OCEAN (97.7%) IS IMPACTED BY MULTIPLE HUMAN STRESSORS.

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A CALL TO PROTECT OUR OCEANS

The ocean sustains life on Earth, providing habitat for a rich array of species, absorbing vast amounts of carbon from the atmosphere (**Section 2**), and providing food and livelihoods to billions of people across the world (**Sections 1 and 3**). Yet just 8% of the ocean is protected, with only 2.4% highly protected.[177] Almost the entire ocean (97.7%) is impacted by multiple human stressors,[178] putting fish populations, marine biodiversity and critical ecosystems at risk.

Industrial fishing is one of the greatest threats to the ocean, occurring in over 55% of its area – four times the spatial extent of land-based agriculture.[179] Overfishing and destructive fishing practices (see **Sections 5 and 7**) damage the ocean's capacity to act as a carbon sink and threaten the survival of marine ecosystems, undermining the resilience of coastal communities that have depended on, and lived in harmony with, the ocean for centuries.

Across the world fisheries are in decline – over a third of fish populations are now over-exploited.[180] Stocks of commercially valuable species have plummeted – bluefin tuna, for example, has declined by 97% compared to historic levels.[181] Blue carbon ecosystems are also disappearing – 25-50% of blue carbon cover has been lost over the last 50 years.[182] These ecosystems cover only 0.2% of the Earth's surface yet store up to half of carbon sequestered by the ocean.[183]

Our ocean is critical in the fight against climate breakdown. Failing to protect it from further degradation risks worsening global heating and associated biodiversity loss, with catastrophic impacts for global fisheries, and the food security and livelihoods of billions of people. Urgent action is needed to ensure the future of this critical carbon sink.

30X30 AGREEMENT

'30 by 30' is a global conservation initiative – enshrined in Target 2 of the Kunming-Montreal Global Biodiversity Framework[184] – that aims to conserve and protect 30% of the world's land and seas by 2030. In the ocean, this means creating a global network of MPAs – areas of the ocean designated for protection due to their ecological value and importance, where there are often limits on human activities such as underwater drilling, fishing and diving.

MPAs can be highly effective conservation tools when they are well-designed and enforced, presenting considerable benefits for marine wildlife and coastal communities,[185,186] including through business opportunities based on eco-tourism.[187] Properly managed MPAs can have rapid and lasting positive impacts on fish populations,[188,189] with potential 'spillover' effects to surrounding areas generating benefits for local fisheries.[190] Protected areas have also been shown to enhance the resilience of marine ecosystems to stress caused by extreme climatic events.[191]

The effectiveness of MPAs, however, is heavily dependent on how they are implemented. If poorly designated, managed or enforced, MPAs can fail to achieve their conservation objectives[192,193] and, at worst, create negative impacts for local communities.

Fully protected MPAs with 'no-take' zones – where no extractive industries are permitted to operate – provide the strongest conservation benefits.[194] An analysis of scientific studies found fish biomass to be 343% greater in fully protected areas than in partially protected MPAs.[195]

Such no-take zones must, however, be designed appropriately to ensure they do not harm the livelihoods and food security of local communities. MPAs face similar issues to terrestrial conservation in that they risk becoming a tool for 'ocean grabbing',[196] where coastal and Indigenous communities are shut out of culturally and economically important areas. MPAs must not be a new form of 'fortress conservation', or further displace, oppress or endanger the lives, livelihoods and traditions of coastal and Indigenous communities, who often face existing vulnerability and marginalisation.

Rather, local communities and Indigenous peoples should be placed at the centre of conservation efforts through the implementation of co-management – where MPAs are managed by local communities, with the support of state and non-state actors, such as NGOs (**Box 6**). The involvement of local and Indigenous communities helps to ensure the protection of their cultural, economic and social rights, and can greatly benefit the health of coastal and marine ecosystems through the use of traditional knowledge.[197]

MPA effectiveness varies significantly across the globe due, in part, to the lack of internationally enforceable guidelines on exactly what constitutes an MPA. The level of protection varies considerably from country to country, and is frequently inadequate for proper conservation of these vital marine ecosystems – only 3.6% of declared MPAs have been implemented, and only 2% are fully protected.[198]

Due to poor management, monitoring or enforcement, MPAs may become 'paper parks' that provide little or no actual protection.[199] In many instances, harmful fishing practices have been permitted to continue – bottom trawling and dredging, for example, took place in 97% of the UK's MPAs in 2019.[200] Meanwhile, 86% of European MPAs are impacted by fishing practices that threaten the very seabed habitats they are intended to protect.[201]

BOX 6: MADAGASCAR'S MIHARI NETWORK

Along the coast of Madagascar, the MIHARI network is championing local management of protected areas. An acronym for MItantana HArena and Ranomasina avy eny Ifotony, MIHARI translates to 'marine resources management at the local level' and brings together over 219 fishing communities representing more than 80 locally managed marine areas (LMMAs).

MIHARI promotes the long-term management and conservation of marine ecosystems by resource users themselves through pursuing avenues for livelihood diversification in degraded areas, building solidarity and capacity in fishing communities, and advocating for the protection of their rights and interests.[202]

Since the creation of Madagascar's first LMMAs, the country's coasts and coastal communities have seen significant environmental and socioeconomic benefits.[203] MIHARI enhances these effects by facilitating peer-to-peer learning and building a united front for LMMAs to voice their concerns and demands at the national level. This coordination across institutional scales is essential for effective co-management as it provides bottom-up conservation efforts with critical policy support, without which these LMMAs face considerable barriers to success.[204]

MIHARI serves as a strong example of how the establishment of protected areas can benefit coastal communities. Effective co-management, as opposed to top-down conservation measures, can protect both the health of marine ecosystems and the rights of those who depend on them. These approaches should place resource users at the centre of MPA designation and management, prioritise and recognise the importance of local knowledge, and support local conservation efforts across institutional scales and policy.

HALF THE PLANET AND NO PROTECTION: THE HIGH SEAS

Making up half of the Earth's surface and 61% of the ocean,[205] the high seas are central to oceanic carbon sequestration, home to an astounding array of species, and play a vital role in the stability of marine and coastal ecosystems across the world. These areas outside national jurisdiction are almost completely lacking in protection – only 1% of the high seas are protected under international agreements, with less than 0.1% of the high seas lying in implemented and fully or highly protected areas.[206]

THE HIGH SEAS TREATY

In March 2023, after almost two decades of discussions, UN member states finally agreed on a new legally binding instrument for the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction – the UN High Seas Treaty.[207]

The new agreement, agreed under the UN Convention on the Law of the Sea (UNCLOS), represents a monumental step forward for the protection of our ocean.[208] It provides a legal mechanism to establish large-scale MPAs on the high seas, requires Environmental Impact Assessments for planned human activities, and addresses the equitable sharing of marine genetic resources.[209] States must now work to formally adopt and ratify the High Seas Treaty to bring it into force and intensify international cooperation to secure its urgent and effective implementation. This must include the rapid designation of a comprehensive network of MPAs in areas beyond national jurisdiction, reflecting the critical role played by the high seas in the stability of the climate and global biodiversity.

RECOMMENDATIONS

- Commit, as a minimum target, to the 30x30 ocean protection plan and designate at least 30% of the ocean – including national and coastal waters and the high seas – as ecologically representative fully or highly protected MPAs by 2030. Protected areas should incorporate the full range of ecosystem types, in recognition of the interdependent relationships between different coastal and marine ecosystems.
- Ensure that all efforts to protect and restore the ocean are human rights-consistent, with the effective participation of local and Indigenous communities in decision-making processes. Carefully implement MPAs, ensuring they are co-designed and co-managed with local and Indigenous communities and that they protect both wildlife and people.
- Provide the resources necessary to properly protect designated MPAs. Ensure that MPAs are monitored and fully enforced to prevent them from becoming 'paper parks' that provide no true protection to ocean ecosystems.
- Work to formally adopt and ratify the UN High Seas Treaty and intensify international cooperation to secure its urgent and effective implementation, including the rapid designation of a comprehensive network of MPAs in areas beyond national jurisdiction with high standards of protection for marine biodiversity and ecosystems.

05

ILLEGAL AND UNSUSTAINABLE FISHING

OVERFISHING AND IUU FISHING RISK PUSHING OCEAN ECOSYSTEMS INTO TOTAL COLLAPSE

IUU FISHING ACCOUNTS FOR ONE IN EVERY FIVE FISH CAUGHT AND COSTS THE GLOBAL ECONOMY BETWEEN US$10 BILLION AND US$23.5 BILLION EVERY YEAR.

A THREAT TO OUR OCEAN, LIVELIHOODS AND FOOD SECURITY

Our seas and oceans are in a state of crisis. Over a third of fish populations assessed by the United Nations Food and Agriculture Organization (FAO) are exploited at unsustainable levels ('overfished') and a further 57% are fished to their maximum sustainable levels.[210] Since industrial fishing began in the early 1950s, the world has lost around 90% of large ocean fish – such as sharks, cod and swordfish[211] – while the fraction of fish populations fished at biologically sustainable levels has declined by over 25% since the mid 1970s.[212]

Overfishing and IUU fishing risk pushing ocean ecosystems into total collapse. Overfishing is reducing the resilience of fish populations and marine ecosystems, making them more vulnerable to the impacts of climate breakdown.[213] IUU fishing – which includes all fishing that contravenes fisheries laws or occurs outside the reach of fisheries laws and regulations[214] – remains one of the greatest threats to marine ecosystems and to the coastal communities that rely on their resources for nutrition and livelihoods.[215] It accounts for one in every five fish caught – in some regions, close to 40% of the total catch – and costs the global economy between US$10 billion and US$23.5 billion every year.[216]

Examples of illegal fishing activities include fishing in closed areas or during closed seasons, targeting protected species, using prohibited fishing methods and fishing without a valid licence. These practices present a grave threat to the world's fish populations and marine biodiversity, and to the livelihoods and food security of coastal communities, particularly in the Global South.

The destructive and often illegal exploitation of fish populations threatens the economic and social well-being of fishing communities that are heavily reliant on fishing for food and livelihoods. Across West Africa – which suffers from some of the highest levels of illegal fishing in the world[217] – an estimated 6.7 million people depend directly on fisheries for food and livelihoods,[218] with fish providing essential nutrition and accounting for over 50% of animal protein intake in countries such as Ghana and Sierra Leone.[219] In recognition of its implications for global development – and as one of the main impediments to achieving sustainable world fisheries[220] – ending IUU fishing has been identified as a target of SDG 14 (life below water).[221]

Illegal practices often thrive in countries or areas where fisheries management is poorly developed, or where there are limited resources to enforce regulations. With fish populations diminishing and global demand at an all-time high, vessels are turning to illegal fishing to minimise costs and maintain profits – remaining at sea for longer and travelling further for ever-diminishing returns. Driven by the desire to reduce operating costs, IUU fishing is also often associated with trafficked or forced labour to crew vessels (**Boxes 7 and 8**).[222]

ILLEGAL FISHING THRIVES IN THE SHADOWS

IUU fishing is highly lucrative, resulting in billions of dollars of illicit financial flows every year.[223] It is often associated with forgery, fraud, money laundering and other enabling crimes, as well as forced labour (see **Boxes 7 and 8**),[224] and is increasingly looked at from the perspective of transnational organised crime.[225] Corruption, which occurs throughout the fish value chain,[226] is recognised as an enabler of IUU fishing, unsustainable fishing and related abuses,[227,228] undermining law enforcement, environmental compliance and good governance[229] with the potential to render futile all efforts to regulate fisheries and combat fisheries crime.[230]

Illegal fishing and other criminal activities thrive in the opaque operating environment that characterises the global fishing industry. Fishing often takes place in remote locations, far removed from regulatory oversight and from the corporations and individuals that stand to benefit financially from the activities. Illegal operators create confusion around their identities, escaping detection by changing vessel names, concealing ownership, switching flags to avoid detection, or removing ships from registers entirely. Vessel identification systems – which allow vessels to be tracked – are tampered with, switched off or missing altogether, while 'front' companies are set up so that the true beneficiaries of illegal practices can evade prosecution.

Opaque and complex operations and corporate structures preclude identification of the 'actors' involved – whether the fishing vessels themselves, the authorities responsible for monitoring and controlling their activities, the supply chains for their products, or their owners. Licensing of who can fish what, where, when and how, often takes place without public scrutiny, further obscuring the picture. The difficulties associated with uncovering a vessel's past and current activities and following catches to market also present a major barrier to achieving traceability in seafood supply chains.

BOX 7: ILLEGAL FISHING AND HUMAN RIGHTS ABUSES AT SEA

In 2020, EJF and Korean NGO, Advocates for Public Interest Law (APIL), exposed serious alleged human rights abuses on a Chinese distant water fishing vessel, the Long Xing 629, operating in the western Pacific. Four of the vessel's crew members – all of Indonesian origin – died between December 2019 and March 2020 after suffering symptoms including swelling and chest pain. It is alleged that despite requesting medical care for months, the captain refused to return to port for the crew to access appropriate care. Investigations uncovered a series of serious alleged human rights abuses including: average working days of 18 hours, confiscation of passports, deduction of wages, being forced to drink poorly treated seawater, as well as instances of physical assault by the Chinese crew. These abuses were facilitated by a number of at-sea trans-shipments (transfers of catches to refrigerated carrier vessels), which meant the crew were kept at sea for 13 months.

The case of the Long Xing 629 demonstrates how human rights abuses and IUU fishing often intersect. The vessel was allegedly involved in illegal shark fishing and finning, as well as trans-shipment of illegal catch. Illegal shark finning – the barbaric practice of removing a shark's fins, often while it is still alive, and throwing the shark back into the water for it to die a slow and painful death – was allegedly practised routinely on the Long Xing 629, and was also found to be prevalent on 11 of its sister vessels. A range of shark species were caught, including the critically endangered Scalloped Hammerhead, the endangered Shortfin Mako and the vulnerable Great White Shark.[231]

BOX 8: ILLEGAL FISHING IN SOMALIA

Since 2020, EJF has identified several alleged cases of suspected IUU fishing activities involving trawling in Somali waters.

One such case involved a fleet of Chinese-flagged trawl vessels and a fish carrier vessel (including the Liao Dong Yu 535, 571, 572, 575 and 577) operating in Somalia since September 2020. In June 2021, the fisher's welfare organisation 'Destructive Fishing Watch' received reports that 13 of the fleet's Indonesian crew members had been stranded in Somalia for six months. Despite their contracts ending in December 2020, the crew were reportedly forced to continue working and vessel operators refused to repatriate them.

While working on the vessels, crew members allegedly reported suffering physical and verbal abuse and being denied meals as punishment. Some workers fell ill, experiencing difficulty breathing and swollen legs (potentially indicating beriberi disease/thiamin deficiency), leaving some struggling to walk. Safety equipment was inadequate; crew were also forced to drink unfiltered tap water and, if unwilling to pay for vegetables, had to subsist on a diet of porridge and anchovies. Tragically, workers lost their lives while working onboard. In June 2021, a wave hit one of the fleet's vessels and forced open a heavy trawl door, killing one worker on impact and throwing another into sea. In August 2021, another worker lost his life, as one of four crew members attempting to flee one of the vessels for shore. The crew were eventually repatriated with the assistance of local and international NGOs, including EJF.

Workers reported alleged IUU fishing offences including fishing without a valid licence, fishing using prohibited gear, fishing in a restricted zone, and fishing for protected or endangered species. Species caught by the vessels included sharks, turtles and dolphins, including the vulnerable Leatherback turtle and rare Megamouth Shark. Shark finning was also allegedly practised onboard.

Also in Somalia, EJF identified the case of the Wadani 1 – a trawl vessel of unknown flag that was part of a wider fleet with a history of labour abuses that moved to Somalia in 2019. Crew members allegedly had been made to work past their completed contracts in 2019 and 2020, experiencing wage and document retention; poor living and working conditions; and lack of medicine, food and clean water. Following a plea for assistance through social media, EJF helped repatriate four Thai workers and 11 Indonesian workers in 2020. The vessel was suspected of operating close to shore within the zone reserved for artisanal fishers under Somali Fisheries Law, and catching protected and endangered species, including turtles (Olive Ridleys, Loggerheads) and the endangered Whale Shark.[232]

THE IMPORTANCE OF TRANSPARENCY AND ACCOUNTABILITY

Transparency is the cornerstone of the fight against IUU fishing and the achievement of sustainable, legal and ethical global fisheries. To manage fisheries sustainably we need to be able to measure all relevant aspects – namely, where and when fishing boats are operating, what and how they are fishing, and who is working on board. Full transparency of information is critical and must be accessible to all interested parties, from governments to retailers, consumers and civil society organisations.

Delivering transparency across all aspects of seafood production and supply chains, through improved legal requirements and operational practices within fisheries management regimes, would be transformative. Such reforms offer the most cost-effective, operationally efficient and politically realistic measures to build effective enforcement against both illegal fishing and associated human and labour rights abuses. Transparency allows enforcement agencies and management officials to leverage limited assets and financial resources to the best effect, simultaneously giving other stakeholders – such as retailers and NGOs – the opportunity to scrutinise production and supply chains to identify abuses. This can reward law-abiding businesses while weeding out illegal, unscrupulous players.

The Global Fisheries Transparency Coalition, a global community of ocean advocates campaigning for increased transparency at sea, has developed ten principles for transparency in global fisheries (**Box 9**),[233] pinpointing the most essential transparency priorities needed to increase equity in fisheries and combat illegal fishing and human rights abuses at sea. These simple measures would shed light on vessel identities, activities and ownership, making action against IUU fishing easier, cheaper and more effective, thereby delivering a substantial contribution toward securing sustainable, legal and ethical fisheries worldwide. While the measures can be implemented immediately by governments, leadership, political will and support for the necessary actions are paramount.

TRANSPARENCY ALLOWS ENFORCEMENT AGENCIES AND MANAGEMENT OFFICIALS TO LEVERAGE LIMITED ASSETS AND FINANCIAL RESOURCES TO THE BEST EFFECT.

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BOX 9: TEN PRINCIPLES FOR TRANSPARENCY IN GLOBAL FISHERIES

These principles are designed to be implemented by states so that information about vessels and fishing activity is widely available to support fisheries management regimes that ensure seafood is free from IUU fishing and human rights abuses. They are intended for the entire fisheries sector – readily implementable in industrial fisheries, with some principles requiring further adaptation before they can be effectively applied to all small-scale fisheries.

1 GIVE ALL FISHING VESSELS A UNIQUE IDENTIFICATION NUMBER.

To avoid the scrutiny of enforcement agencies, illegal operators may conceal or change a vessel's identity, sometimes even while the vessel is at sea. One of the easiest and most cost-effective ways of ending this practice is to require that all vessels be given a unique vessel identification number. Similar to a car's registration number, this should stay with each vessel from shipyard to scrapyard. Data should be provided to relevant bodies, including the FAO Global Record.[234]

2 PUBLISH LISTS OF FISHING LICENCES, AUTHORISATIONS, SUBSIDIES, FISHING ACCESS AGREEMENTS AND SANCTIONS FOR FISHERIES AND LABOUR OFFENCES

The publication of central, digitised lists of licences and authorisations can help improve scrutiny of fishing operations, allowing enforcement agencies, NGOs, and other countries to determine who is fishing where and for what, and to use this information to bring IUU fishing offences to light.

Where illegal operators are successfully prosecuted, it is vital that such cases be made publicly available, and a vessel's history of illegalities be added to regional and global vessel watchlists. Information-sharing across key nations – the state whose flag the vessel flies, the state where the illegal fishing took place, and states where the vessels may come to port – helps to ensure that enforcement agencies around the world can quickly identify if such vessels arrive in their ports or waters, and that operators cannot simply relocate their illegal operations to a new jurisdiction.

3 PUBLISH DETAILS OF THE TRUE OWNERS OF EACH VESSEL – WHO TAKES HOME THE PROFIT?

To remain hidden, illegal operators often maintain an intricate, layered web of deception. Front or shell companies, owner pseudonyms, and the changing of vessel identities multiple times and often at sea – are all tactics used to evade detection and punishment. Countries can address this by requiring all operators to provide details of true 'beneficial' ownership when registering their vessels or applying for a licence, and making these details public.

4 STOP THE USE OF FLAGS OF CONVENIENCE AND PUNISH ALL NATIONALS[235] INVOLVED IN IUU FISHING AND ASSOCIATED OFFENCES, REGARDLESS OF THE FLAG OF THEIR VESSEL

Illegal operators often exploit lax regulations for registering their vessels to a country's flag (so-called flags of convenience). They may also 'flag hop' – change flags on a regular basis to throw enforcement authorities off of their trail. International cooperation and the adoption of minimum vessel and flag registration standards across the world is vital to prevent flag hopping and deny refuge to illegal operators seeking to escape detection or enforcement.

5 REQUIRE VESSEL POSITIONS TO BE PUBLIC

Satellite tracking systems provide an effective means of detecting whether vessels are fishing in illegal locations – such as within MPAs or IEZs – or fishing at forbidden times, such as during fishing closed seasons. But these systems are only as effective as a nation's monitoring capacity, and the enforcement action that follows. Making tracking data public allows other countries, regional bodies, and NGOs to raise the alarm when offences have taken place, and when they have gone unpunished.

6 BAN TRANSFERRING FISH BETWEEN BOATS AT SEA – UNLESS CAREFULLY MONITORED

At-sea trans-shipment – the transfer of catch, fuel, supplies and even crew between vessels at sea – can take place thousands of kilometres from shore and from the scrutiny of fisheries authorities. This practice enables unscrupulous operators to keep workers at sea unpaid for months or years. It also makes the source of the fish, once landed, very difficult to trace.

Trans-shipment must be either banned or be closely monitored by both human observers and electronic monitoring such as cameras. The practice should only be allowable under these conditions and if explicit advance permission has been granted – either by the state where the vessel is fishing or the relevant RFMO. Logs of trans-shipments should be available to the public.

7 MANDATE THE ADOPTION OF ROBUST CONTROL SYSTEMS THAT ENSURE SEAFOOD IS LEGAL AND TRACEABLE FROM BOAT TO PLATE

The ability to accurately trace seafood throughout all stages of the supply chain – through capture, landing, processing and subsequent sales – is essential to guarantee the legal origin of products and is considered a 'must-have' for any company seeking to remain competitive in the seafood industry.[236] Key data elements[237] that accompany seafood from boat to plate should be standardised and reliable, and be made publicly available.

8 ADOPT INTERNATIONAL MEASURES THAT SET CLEAR STANDARDS FOR FISHING VESSELS AND THE TRADE IN FISHERIES PRODUCTS

Illegal fishing is frequently transboundary in nature, involving multiple jurisdictions. States must therefore work together to formulate regional and international policies to deter, identify and prosecute illegal operators. Countries should seek to ratify and comply with key international agreements, such as the UN Port State Measures Agreement (PSMA), the Cape Town Agreement and the International Labour Organization's (ILO) Work in Fishing Convention (C188). Widespread implementation of these instruments would facilitate international harmonisation of fisheries policies, creating a regulatory barrier to illegal operators.

9 PUBLISH DATA ON FISHERIES MANAGEMENT AND ENSURE PARTICIPATION OF ALL STAKEHOLDERS IN DECISION-MAKING

Sustainable and equitable fisheries management depends on the appropriate participation of small-scale fishers, industry associations and civil society in the development of fisheries rules, regulations, subsidies and budgets, and in decisions on access to fisheries resources. These processes, policies and decisions, along with all fisheries data and scientific assessments, should be made easily accessible to the public and enforcement agencies. Participatory decision-making is key to enhancing accountability and tackling corruption, while helping to secure the rights of fishers and fish workers to their livelihoods, food security and sustainable development.

10 COLLECT AND VERIFY DATA ON CREW MEMBERS, RECRUITMENT PROCESSES AND VESSEL CONDITIONS, AND PUBLISH INFORMATION IN AN AGGREGATE FORM

Robust data should be collected and verified on crew identities and demographics (including nationality, age, race and gender), contractual terms, recruitment agencies, location and means of joining vessels, and conditions on vessels, and published in aggregate form. This is critical to preventing the trafficking of workers and the use of bonded, forced and slave labour, which is often associated with vessels implicated in IUU fishing.[238]

IT IS CRITICAL NOW THAT SEAFOOD INDUSTRY LEADERS UPSCALE ACTION TO END OVERFISHING, IUU FISHING AND ASSOCIATED HUMAN RIGHTS ABUSES.

MEASURES TO COMBAT IUU FISHING AND ASSOCIATED ABUSES

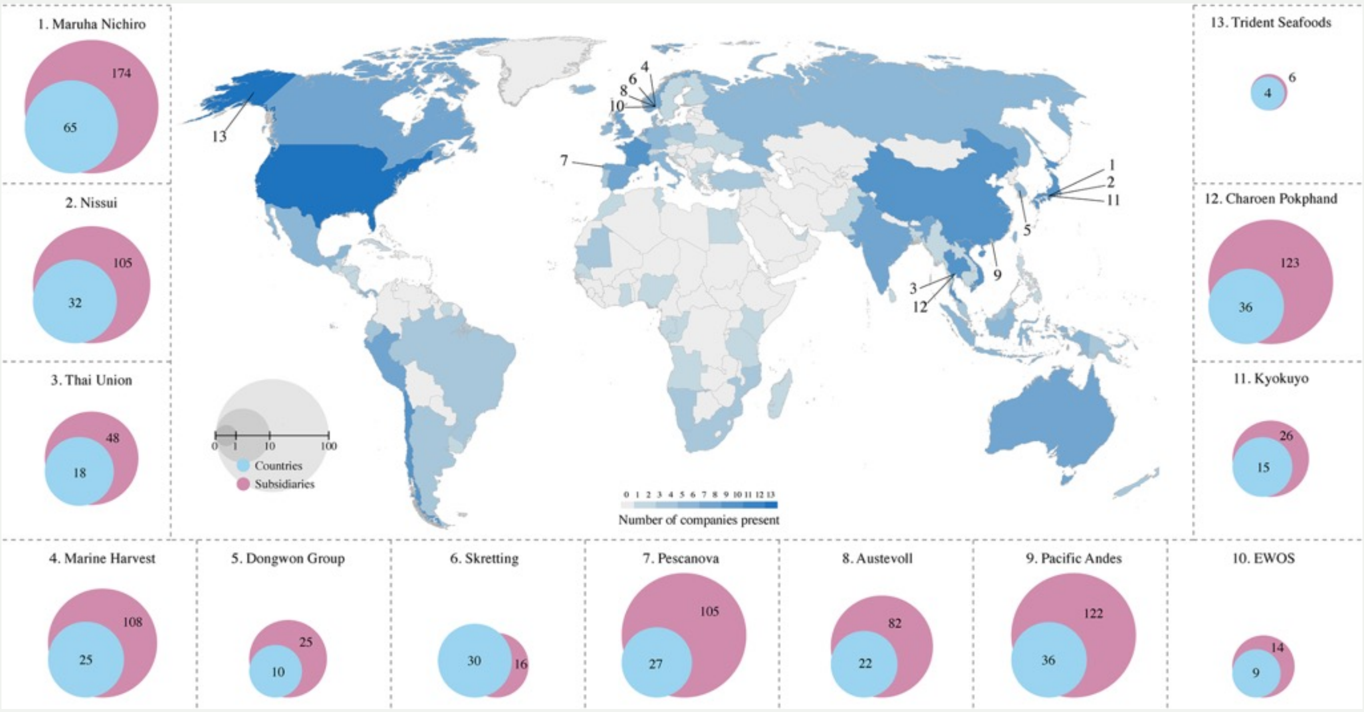
A broad portfolio of measures is required to eradicate IUU fishing, from enhanced monitoring, control, surveillance and enforcement, to strengthened corporate due diligence. Governments must recognise the scale and impacts of this problem and take the necessary steps to eradicate it.

In addition to improving transparency in global fisheries, every nation must seek to assess and reduce the risks of illegal fishing. Limiting the time permitted at sea, for instance, will bring vessels back to port frequently, allowing for inspections and giving crew a chance to raise the alarm over illegal fishing or abuse. Electronic monitoring – such as CCTV on vessels – can provide more extensive monitoring of distant water fleets and should be employed, especially in developed countries, where budgets allow greater investment.

Measures to improve transparency are only as effective as the enforcement and prosecutions that follow their deployment. Without effective enforcement, there can be no deterrence. Countries must ensure that law enforcement authorities and the judiciary are adequately equipped, trained and screened for corruption to facilitate prosecution and punishment of individuals and – where allowed by domestic law – corporations that support or engage in IUU fishing and associated abuses, based on clear and comprehensive legal frameworks. Punishments for illegal fishing and associated human and labour rights abuses must be deterrent, but should not disproportionately impact small-scale fishers.

Countries that import seafood should implement strong import regulations that bar illegally caught seafood at their borders. At a regional level, the EU IUU Regulation is an example of a world-leading measure to combat IUU fishing.[239] The regulation serves both as best practices for port and market states seeking to block illegally caught seafood, as well as a punitive measure for non-EU states that fail to combat IUU fishing. If there is nowhere left to sell their ill-gotten gains, illegal operators will be forced out of business.

FIGURE 1: GLOBAL NETWORKS OF THE 13 LARGEST SEAFOOD CORPORATIONS



This heat map illustrates the number of 'keystone' actors operating in each country and the respective number of countries in which each company operates (blue circles), as well as the total number of subsidiaries of that company (purple circles). Company headquarter locations are indicated by the corresponding numbers on the map.

Source: Österblom H, Jouffray J-B, Folke C, Crona B, Troell M, Merrie A, et al. (2015) Transnational Corporations as 'Keystone Actors' in Marine Ecosystems. https://doi.org/10.1371/journal.pone.0127533

The seafood industry has a critical role to play and responsibility to drive these reforms forward. A handful of major seafood corporations have a massive impact on global fisheries – just 13 corporations have been shown to control 11-16% of global marine catch (9-13 million tonnes) and 19-40% of the largest and most valuable fish stocks (Figure 1).[240] In 2012, the top 10% of the largest seafood companies accounted for 38% of total revenues, with a trend towards further consolidation of operations amongst the most powerful players.[241] These corporations exert a huge influence on ocean governance, with the potential to hinder or promote a global shift towards sustainability.[242,243]

To date, however, these corporations and the major seafood retailers have largely failed to take action commensurate with the crisis facing our ocean – a crisis which also presents a major threat to the long-term viability of business operations. It is critical now that seafood industry leaders upscale action to end overfishing, IUU fishing and associated human rights abuses, calling forcefully on governments worldwide to implement the Global Transparency Charter, while swiftly implementing robust net-to-plate traceability and due diligence processes[244] to keep illegal and slave-caught fish out of their supply chains.

RECOMMENDATIONS

- → Improve transparency in the fisheries sector as a whole by immediately and fully implementing the ten principles of the Global Charter for Transparency, including publishing key information on fishing vessels, beneficial ownership and infractions; mandating unique vessel identifiers (in the form of IMO numbers where eligible) for fishing vessels; making vessel tracking data public; and banning at-sea trans-shipment, unless carefully monitored.
- → Take concrete actions to end the use of flags of convenience in the fisheries sector, including requiring details on ownership arrangements when registering and licensing fishing vessels to ensure beneficial owners can be identified and held to account for any subsequent infractions, and ultimately, removing foreign-owned fishing vessels and fish carriers altogether from vessel registries.
- → Ensure that law enforcement authorities and the judiciary are adequately equipped, trained and screened for corruption to facilitate the prosecution and punishment of individuals and – where allowed by domestic law – corporations that support or engage in IUU fishing and associated abuses, based on clear and comprehensive legal frameworks. Punishments for illegal fishing and associated human and labour rights abuses must be deterrent, but should not disproportionately impact small-scale fishers.
- → Tackle the enablers of IUU fishing and human rights abuses, in particular corruption through, inter alia, risk mitigation strategies that include preventive, law enforcement and transparency measures.
- → Ensure that the authorities responsible for controlling fishing activities and trade flows in fisheries products are given the necessary resources, powers, tools and technologies – such as strong import control systems and, where appropriate, electronic monitoring – to fight IUU fishing and associated abuses.
- → Adopt and implement robust legislation requiring industry to undertake mandatory due diligence to identify IUU fishing, human rights and labour risks in their supply chains, and establish full supply chain transparency from 'net to plate'.
- → Ratify and implement key international conventions aimed at ending illegal fishing and human rights abuses on fishing vessels, including the PSMA, ILO Work in Fishing Convention, and the IMO Cape Town Agreement.
- → Ensure that foreign fishing access agreements – particularly in the waters of lower-income countries – are sustainable and equitable, making sure that marine ecosystems and food security are not compromised and that the rights and livelihoods of small-scale fishing communities are supported.
- → Strive towards the establishment of RFMOs or other regional arrangements for fisheries/regions falling outside of current RFMO remits, such as West Africa for small pelagic and demersal fish populations, and in the Atlantic and Indian Oceans for squids.

06

HARMFUL FISHERIES SUBSIDIES

FUEL SUBSIDIES, TAX BREAKS, LOANS AND GRANTS ARE ENABLING THE OVER-EXPLOITATION OF OUR SEAS

MORE THAN 80% OF GOVERNMENT FISHERIES SUBSIDIES BENEFIT LARGE INDUSTRIAL FLEETS, DISTORTING ACCESS TO MARINE RESOURCES AND DESTROYING THE HEART OF MANY COASTAL COMMUNITIES.

A GLOBAL INJUSTICE

According to the UN Food and Agriculture Organization, more than 35% of our world's fish populations are overfished, and this proportion is only rising.[245] Meanwhile around US$22 billion was spent in 2018 on subsidies — public funding to make fisheries more profitable — to increase fishing capacity.[246] In many cases fish populations have been so heavily exploited that fishing vessels rely on the distorting effect of subsidies to turn a profit: according to a 2018 study, as much as 54% of fishing grounds outside of national jurisdictions – the high seas – are unprofitable at current fishing rates.[247]

Some of the most damaging types of harmful subsidies include fuel subsidies, tax breaks, and loans or grants given out by governments for fishing vessel construction and modernisation, and for the procurement of fishing gear. More than 80% of government fisheries subsidies benefit large industrial fleets, distorting access to marine resources and destroying the heart of many coastal communities.[248] Foreign distant water vessels fishing off the African coast receive twice the amount of subsidies than goes to African vessels themselves,[249] with subsidies for distant water fishing activities often worth as much as 20-40% of the total catch value.[250] A recent study revealed how harmful subsidies disproportionately impact nations with lower management capacity and more vulnerable fish stocks – 40% of the harmful subsidies that support fishing in the waters of nations with a very low HDI originate from high-HDI and very-high HDI nations.[251]

For too long, these subsidies have devastated marine wildlife, local livelihoods and food security around the world. Fish are a vital source of protein in least-developed countries.[252] As fish populations decline, vulnerable coastal communities are forced into food insecurity and poverty; more than half of the small-scale fishers that EJF recently interviewed in Ghana reported going without sufficient food in the last year.[253] An open letter[254] from the Ghana National Canoe Fishermen's Council says that if illegal fishing — driven in part by harmful fisheries subsidies[255] — isn't addressed, "the source of income for over 2.7 million Ghanaians will be lost." (**Box 11**)

BOX 10: SUBSIDIES TO CHINA'S DISTANT WATER FLEET

The Chinese distant water fleet operates across almost the entire globe – making China the largest global fish producer by some margin.[256] Its exact size uncertain,[257] the fleet has been linked to high instances of IUU fishing, widespread use of harmful fishing gear such as bottom trawls, and a strong presence in regions where fish populations are in jeopardy due to overfishing and in which there is poor governance and insufficient monitoring, control and surveillance capacity.[258] West Africa, for instance, which is simultaneously home to communities extremely reliant on fisheries and has long been considered a hotspot for overfishing and IUU fishing, has seen an influx of Chinese distant water fishing vessels since the mid-1980s.[259] Estimates suggest that the Chinese bottom trawl fleet catches an estimated 2.35 million tonnes per annum in the region – by some estimates, around 50% of China's total distant water catch – valued at over US$5 billion.[260]

The Chinese distant water fleet is substantially bolstered by national subsidies. According to recent estimates by the China Ocean Institute and Oceana, the fleet accounts for just 22% of China's total captured fish, yet receives 49% of harmful capacity enhancing subsidies from the Chinese government to help with costs such as fuel and the construction of vessels and harbours.[261] These harmful subsidies amounted to 11.9 billion yuan (approx. US$1.8 billion) in 2019. To put this in perspective, these subsidies accounted for over 38% of all the harmful subsidies of the top ten subsidising nations, and more than twice as many as any other single country.[262,263] Moreover, researchers documented that the Chinese government's reporting on its subsidies programme has reduced in transparency since 2012.[264]

BOX 11: SUBSIDIES IN GHANA

Although foreign ownership is prohibited in the Ghanaian trawl sector, the vast majority of trawlers – an estimated 90% – are owned and controlled by Chinese corporations that use Ghanaian 'front companies' to gain registration.[265] Despite vast overcapacity and widespread illegal fishing, these corporations are still able to benefit from subsidies.[266]

In 2019, one state-owned Chinese company with trawl operations in Ghana reported receiving subsidies of around US$3 million for the development of its overseas fishing operations. One of the company's vessels is currently the subject of a court case for illegal fishing in Ghana. At least six Chinese fishing companies with trawl operations in Ghana have obtained 'ocean fishery enterprise' qualifications from the Chinese government, which confer eligibility to receive state subsidies.[267]

The damage that such vessels perpetrate, while benefiting from state support, is deeply concerning. In recent years, EJF documented several Chinese-owned vessels engaging in an extremely destructive form of illegal fishing, known locally as 'saiko'.[268,269] In this illegal trade, trawlers target the staple catch of canoe fishers, and sell this stolen fish back to local communities at a profit.

In 2017 alone, the saiko trade took around 100,000 tonnes of fish, worth over US$50 million when sold at the landing site.[270] Landings of a key species – sardinella – have crashed by around 80% over the past 20 years,[271] threatening ocean ecosystems, coastal livelihoods and food security.

Harmful fisheries subsidies also have implications for the global climate. As well as the excess fossil fuels that are burnt, 43.5% of the 'blue carbon' that these vessels remove from the ocean comes from the high seas; areas that are often unprofitable to fish without financial support.[272] This very same blue carbon is crucial to addressing the climate crisis (see **Section 2**), and yet through fishing subsidies, taxpayers around the world are paying to destroy it. For every degree Celsius of warming, global fisheries catch potential will fall by more than 3 million tonnes.[273] These impacts will be predominantly felt by equatorial countries – many of them low-income – where annual catches will fall by half.[274]

Removing harmful fisheries subsidies is essential to preserve and restore our ocean ecosystems and would result in an increase of 12.5% in global fish biomass by 2050 – approximately 35 million metric tonnes of fish, estimates suggest.[275]

AN INTERNATIONAL CONSENSUS

In July 2022, after 20 years of discussion, the World Trade Organization (WTO) reached an agreement on fishing subsidies. The agreement states that all members should eliminate harmful subsidies contributing to IUU fishing and the overfishing of at-risk fish populations, and requires annual reviews on each nation's progress on implementation and operations.

This WTO agreement gives fishing communities a chance of survival and marks a turning point towards ending this clear injustice. This required a difficult consensus of the 164 member states, making the agreement an important step forward.

ALL COUNTRIES MUST NOW ACCEPT AND IMPLEMENT THE WTO AGREEMENT ON FISHING SUBSIDIES AND GO BEYOND IT, BY URGENTLY REFLECTING ITS PROVISIONS IN THEIR DOMESTIC REGULATIONS AND REMOVING ALL HARMFUL SUBSIDIES, ENSURING TRANSPARENCY THROUGHOUT THE PROCESS.

However, there are still some key loopholes and exemptions which must be addressed if the agreement is to restore a truly thriving ocean. Harmful fisheries subsidies are not limited to those that support illegal fishing or overcapacity. At present, prohibitions on fuel subsidies —which make up 22% of all fisheries subsidies[276] — have been left out of the text. The agreement also relies too heavily on self-reporting by subsidising member countries, with no binding enforcement measures or mechanisms to ensure countries follow through.

IMPLEMENTATION AND BEYOND

Any agreement is only as good as its implementation. All countries must now accept and implement the WTO agreement and go beyond it, by urgently reflecting its provisions in their domestic regulations and removing all harmful subsidies, ensuring transparency throughout the process. The EU and USA – who both have strong commitments to fight IUU fishing globally – should move quickly and lead by example in removing harmful subsidies from their fleets, but every nation can and must go faster and further than this agreement for a truly sustainable ocean.

Negotiations to expand the reach of the WTO agreement are expected to last for another four years. However, we cannot afford further delays; we need quick, joint action at the international and national levels. While the WTO must speed up negotiations to expand the agreement's remit and make it binding, national governments must also go beyond what the WTO mandates and use their powers to drive sweeping change in both policy and action.

Two key aspects will be ending fuel subsidies and addressing subsidies that support fishing overcapacity, which allows vessels to go beyond sustainable catch levels. The latter is mentioned in the agreement, but no comprehensive deal was made.

EJF calls on both international and national actors to include fuel subsidies and fishing overcapacity in their regulatory frameworks and policies, and to take immediate action towards implementing the WTO agreement. If fishing nations take action now and cut the flow of finance to illegal fishing, overfishing and overcapacity, we can drive real progress towards a secure and sustainable future for the ocean and the people who depend on it.

RECOMMENDATIONS:

→ Implement the WTO Agreement on Fisheries Subsidies and go beyond it by urgently reflecting its provisions in domestic regulations and removing all harmful subsidies, ensuring transparency throughout the process. Accelerate negotiations to expand the Agreement's remit and make it binding.

→ Include fuel subsidies and fishing overcapacity in regulatory frameworks and policies, and phase out fishing sector public subsidies, including fuel subsidies, that support fishing beyond sustainable catch levels and perpetuate the destruction of marine ecosystems.

→ Redirect funds gained through ending harmful fishing subsidies towards a just transition for fleets – such as bottom trawlers – to ensure viable alternative livelihood options for workers in the fishing industry.

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07

BOTTOM TRAWLING

ONE OF THE MOST UNSELECTIVE AND DESTRUCTIVE FORMS OF FISHING

BOTTOM TRAWLING LEAVES LIFELESS OCEAN DESERTS IN ITS WAKE, WHILE DISTURBING SIGNIFICANT QUANTITIES OF CARBON STORED IN SEABED SEDIMENT, POTENTIALLY AGGRAVATING CLIMATE BREAKDOWN.

Our ocean is fighting for survival. Less than 3% of the ocean is highly protected, leaving it vulnerable to exploitative fishing practices that threaten the future of the world's seas. Among the worst and most pervasive of these is bottom trawling, whereby large, weighted nets are dragged across the seafloor, scooping up everything in their path and causing immense damage to seabeds.

A DESTRUCTIVE FORM OF FISHING – DAMAGING AND INDISCRIMINATE

Bottom trawling is one of the most unselective and destructive forms of fishing. It causes irreversible damage to marine habitats and can be catastrophic for populations of sensitive species such as sharks, turtles and dolphins. It leaves lifeless ocean deserts in its wake, while disturbing significant quantities of carbon stored in seabed sediment, potentially aggravating climate breakdown. The practice is not only destructive for nature but also coastal communities – by driving coastal erosion, lowering water quality and robbing small-scale fishers of irreplaceable livelihoods, it undermines the ability of already highly vulnerable communities to adapt to climate change.

Bottom trawling is highly unselective: as heavy nets – sometimes the size of a football pitch – are dragged along the seafloor, everything in their path is swept up, including both target and non-target species, so-called 'by-catch'.

When catches are emptied onboard vessels, workers sort through the fish and often discard unwanted, low-value species. These fish have, in many cases, died before they hit the water. Over the past 65 years, bottom trawlers have discarded over 400 million tonnes of untargeted marine life, worth around US$560 billion.[277] Bottom trawling also threatens fish populations by undermining their ability to reproduce – juvenile or gravid fish are often included in catches, while nets cause immense damage to areas of the seabed that are essential for reproduction.[278]

This indiscriminate practice not only threatens the stability of marine ecosystems, but also the food security and livelihoods of coastal communities. Over 100 million people depend on small-scale and subsistence fishing for food resources and livelihoods,[279] often with few alternatives available for income or food.

A significant portion of bottom trawling occurs off the coasts of poorer nations: China is the world's largest bottom trawling nation, with much of these activities taking place along the coast of West Africa. Annual catches by China's bottom trawl fleet in West Africa are estimated at around 2.35 million tonnes per annum, or around 50% of the country's total distant water catches, with a landed (ex-vessel) value of €4.74 billion per year.[280] In countries such as Ghana, these activities are driving declines in fish populations that are critical for local livelihoods and consumption,[281] while generating little to no benefit for coastal state economies.[282] Artisanal fishers often operate in the same areas as bottom trawlers, competing for the same resources and facing loss of income and injury as they come into conflict with these larger boats.[283]


Transform Bottom Trawling.

A THREAT TO CLIMATE AND MARINE LIFE

The ecosystems at risk of decimation by bottom trawling are vital to tackling global heating – blue carbon (**Section 2**) has the capability to be significantly more effective at sequestering carbon than tropical forests[284] (Table 1). The ocean is the world's largest carbon sequestration opportunity;[285] protecting and restoring blue carbon solutions can play a pivotal role in meeting emissions reductions targets and limiting heating to 1.5°C above pre-industrial levels.

Almost 98% of the ocean is under pressure from human-driven stressors, including industrial fishing practices such as bottom trawling.[286] As heavy trawl nets scrape along the seafloor, they cause immense damage to marine wildlife and destroy these essential ecosystems, disturbing the carbon they store and potentially accelerating global heating (**Box 12**). Included in the destruction are seagrass meadows, one of the most efficient carbon sequestering ecosystems in the world.[287] Seagrass meadows can take decades to recover from damage caused by bottom trawling.

In addition to being vital stores of carbon, seagrass meadows and other ecosystems threatened by bottom trawling provide critical breeding grounds and nurseries that underpin healthy fish populations (**Section 3**). However, only 3% of these essential ocean habitats are fully contained within protected areas, and bottom trawling is not prohibited in all MPAs, despite the very clear need to protect these rich, biodiverse areas. Bottom trawling and dredging, another highly destructive fishing practice, took place in 97% of MPAs in the UK in 2019,[288] while in the EU, studies point to a higher intensity of trawling within than outside of MPAs. Indeed, destructive fishing has been found to affect 86% of the areas designated under the EU's Natura 2000 network for the protection of marine wildlife.[289]

BOX 12: KISS TRAWLING IN THE GULF OF GABÈS, TUNISIA

A recent EJF and FishAct investigation examined the impact of a form of bottom trawling – known locally as 'kiss' trawling – in the Gulf of Gabès region of Tunisia, an area of exceptional ecological, cultural and socio-economic importance.[290] Kiss trawlers are small wooden boats of less than ten metres in length that operate bottom trawls generally in waters of between 5 and 15 metres depth, sometimes less. Despite being illegal under Tunisian law, kiss trawling has proliferated over the past decade, with hundreds of kiss trawlers operating in the Gulf of Gabès throughout the year.[291]

The Gulf of Gabès is host to one of the largest remaining expanses of *Posidonia oceanica*, a species of seagrass endemic to the Mediterranean.[292] It is also the location of 'charfia' fishing – a traditional method unique to the Kerkennah Islands that was included in the Representative List of the Intangible Cultural Heritage of Humanity in 2020.[293] The inhabitants of the Kerkennah Islands are heavily reliant on the sea for their livelihoods,[294] while being highly vulnerable to sea level rise caused by global heating.

Kiss trawling is devastating the marine ecosystems in the Gulf of Gabès and the livelihoods of local fishers who depend on them. Kiss trawlers use small mesh nets resulting in extremely high rates of bycatch, much of which is discarded – in some cases over 95%.[295] Small mesh nets catch significant quantities of juvenile fish, accelerating the depletion of fish populations.

Kiss trawlers drag nets and 'otter doors' along the seafloor, destroying sensitive *P. oceanica* meadows, which have suffered catastrophic and, effectively, irreversible losses in recent decades.[296,297] Seagrass meadows are among the most valuable ecosystems on Earth in terms of the goods and services they provide.[298] Rates of carbon sequestration of *P. oceanica* meadows are comparable to key terrestrial carbon sinks such as peatlands,[299] and up to 70 times the rate of tropical forests, absorbing an estimated 15-20% of Tunisia's CO2 emissions.[300] They protect coastal areas from erosion due to rising sea levels – a critical service in the Maghreb, where a high proportion of the population lives on or near the coast[301] and where rates of coastal erosion are the second highest in the world.[302] *P. oceanica* meadows further enhance water quality through oxygenation and serve as an important regional nursery area and habitat for many marine species, including endangered species of shark and marine turtle.[303]

EJF's investigation revealed intense conflict between artisanal fishers and kiss trawlers around the Kerkennah Islands.[304] Fishers complain that kiss trawling is driving declines in fish populations, forcing some to abandon their traditional methods in favour of the illicit practice. Others have turned to migrant smuggling to make a living. Traditional, low-impact methods are unable to compete with kiss trawls, which also damage or tow away artisanal fishing gear. The degradation of marine resources and associated fishery declines have left fishers in a precarious situation, unable to respond to successive economic crises.

STEPS FOR URGENT AND AMBITIOUS CHANGE

The impacts of bottom trawling must be radically reduced for the sake of the climate, the survival of coastal and marine ecosystems, and the communities that rely on them. Greater transparency and accountability must be at the centre of these efforts, supported by strict regulations and effective monitoring and enforcement measures.

Tackling the climate emergency requires a complex, multilateral effort across industries and institutional scales, but the necessity to protect and restore our oceans is unequivocal. Few fishing practices are as detrimental and incompatible with measures to halt global heating as bottom trawling – reducing its global footprint is a very clear and tangible step we can take to ensure the future of marine ecosystems and the people who depend on them.

Establishing, expanding and strengthening inshore exclusion zones (IEZs) reserved for small-scale fishing activities will allow coastal communities to continue fishing in ways that have sustained social-ecological systems for centuries, free from the interference and destruction of bottom trawlers. It is furthermore vital that bottom trawling be banned in all MPAs to protect and recover vulnerable habitats and ecosystems – coupled with stringent monitoring and full enforcement of regulations – as well as prohibited from expanding into new, untrawled areas.

Improving transparency[305] in the fisheries sector (**Section 5**) is fundamental to reducing the impacts of bottom trawling. The harmful subsidies that support bottom trawling activities should also be eliminated (**Section 6**), with funds redirected towards a just transition for fleets to ensure that viable livelihood options exist outside bottom trawling for workers in the industry.

RECOMMENDATIONS:

- → Take concrete action to significantly reduce the global footprint of bottom trawling including, as a minimum, banning bottom trawling in all MPAs to protect and restore vulnerable ecosystems and species – supported by stringent monitoring and full, effective enforcement of regulations – coupled with the prohibition of bottom trawling from expanding into new, untrawled areas.
- → Establish, expand and strengthen IEZs reserved for small-scale fishing activities to support and protect the livelihoods of coastal communities from the interference and destruction of bottom trawling.
- → Redirect funds gained through ending harmful fishing subsidies that enable bottom trawling towards a just transition for fleets to ensure viable alternative livelihood options for workers in the industry.

08

FISHMEAL

EACH YEAR, AROUND 20% OF THE WORLD'S WILD-CAUGHT FISH IS REDUCED TO FISHMEAL AND FISH OIL

IN REGIONS SUCH AS WEST AFRICA, THE RAPID EXPANSION OF FMFO PRODUCTION HAS SEEN RESOURCES PREVIOUSLY DESTINED FOR LOCAL CONSUMPTION DIVERTED TO WEALTHY COUNTRIES PAYING HIGHER PRICES.

"AS THE FASTEST GROWING FOOD SECTOR IN THE WORLD, FED AQUACULTURE DEMAND WILL EVENTUALLY SURPASS ECOLOGICAL SUPPLY OF FORAGE FISH, BUT WHEN AND HOW BEST TO AVOID THIS ECOLOGICAL BOUNDARY IS UNCLEAR". FROEHLICH ET AL. (2018)[306]

Each year, around 20% of the world's wild-caught fish is reduced to fishmeal and fish oil (FMFO), the majority of which is used to feed farmed fish in the global aquaculture industry.[307,308] In 2020, 16 million tonnes of fish were ground down into protein-rich flour or pressed into oil,[309] with much of the catch taken in the waters of the Global South to be fed to high-value aquaculture species in the Global North. The production of FMFO diverts precious fisheries resources away from human consumption, threatens local and global food security, while jeopardising livelihoods and imperilling fish populations.

Aquaculture (fish farming) is increasingly relied upon to meet the surging international demand for seafood. Production has more than tripled in volume over the past two decades,[310] and by 2030, is projected to exceed catches from wild capture fisheries.[311] Today, aquaculture provides nearly half of the fisheries products consumed globally,[312] reaching a record 87.5 million tonnes in 2020.[313] The growth of fed aquaculture has far outpaced non-fed aquaculture, making up nearly 70% of all aquaculture production in 2020 and driving demand for feed ingredients.[314,315]

While aquaculture is often presented as a solution to declines in wild capture fisheries, the production of farmed fish – particularly omnivorous finfish species such as salmon and trout, as well as shrimps – relies heavily on inputs from wild capture fisheries in the form of FMFO. Today, 86% of fishmeal and 73% of fish oil produced globally goes into the production of farmed fish.[316] Despite improvements in conversion rates of wild fish inputs to farmed fish,[317] and the growing (but still limited) use of by-products in FMFO,[318] the aquaculture industry continues to expand, fuelling demand for wild caught fish. China's huge aquaculture sector is the leading consumer of FMFO globally (responsible for over 40% of global imports in 2020),[319] with significant quantities also destined for salmon farms in Norway and Scotland and shrimp farms in Asia.[320]

The main fish species used in FMFO are the nutrient-dense small pelagics, or 'forage fish', such as anchovy, sardinella, mackerel and herring.[321] These species inhabit the lower trophic levels of the marine food chain, serving as prey for predatory species such as tunas and swordfish – many of which themselves support important commercial fisheries – as well as for charismatic megafauna, such as sharks, marine mammals and seabirds, including species of conservation concern[322] (**Box 13**). Thus they play a critical role in ecosystem functioning, while contributing directly and indirectly to tourism revenue and helping to regulate blue carbon, among other services. Global economic value of forage fish has been estimated at US$18.7 billion per annum, which is more than triple the direct catch value of these fish.[323]

BOX 13: PERU - THE WORLD'S BIGGEST PRODUCER OF FISHMEAL

The Peruvian anchovy (*Engraulis ringens*) fishery is the largest supplier of the global FMFO industry, with catches of around 7 million tonnes per year,[324,325] almost all of which is reduced to FMFO.[326] The species plays a key role in the highly productive Humboldt Current System as a prey species for birds, mammals, turtles, and fish such as jack and chub mackerel. While often portrayed as a model of sustainability, Peru's FMFO industry has been plagued by allegations of corruption and non-compliance. These allegations range from the underreporting of fish catches to excessive captures of juvenile fish, as well as concerns regarding air and water pollution from processing plants and associated impacts on public health.[327] The fishery has devastated local ecosystems, taking around 85% of anchovies which would otherwise be available for seabirds and driving drastic declines in seabird abundance,[328] as well as declines in fish species that underpin local livelihoods and food security.[329,330] At the same time, the contribution to Peru's gross domestic product (GDP) is low relative to the size of the fishery,[331] with potentially significant economic and social benefits to be gained from redirecting catches to human consumption.[332]

The FMFO industry is supplied largely by whole fish (as opposed to by-products of wild capture fisheries), the vast majority of which are suitable for human consumption.[333] In regions such as West Africa, the rapid expansion of FMFO production has seen resources previously destined for local consumption diverted to wealthy countries paying higher prices[334,335] (see **Box 14**). With critical fish populations now overexploited,[336] FMFO production is exacerbating an already precarious situation of food insecurity in West Africa,[337] a region in which communities are heavily reliant on fish for nutrition and livelihoods.

BOX 14: FISHMEAL IN WEST AFRICA – MAURITANIA, SENEGAL AND THE GAMBIA

Over half a million tonnes of fish are extracted annually from West Africa's coastal waters and reduced to FMFO for fish and animal farming, mainly in Europe and Asia.[338] This fish could feed over 33 million people each year; more than the combined populations of The Gambia, Mauritania and Senegal.[339] FMFO production in these three countries has increased ten-fold within a decade, from around 13,000 tonnes in 2010 to 170,000 tonnes in 2019.[340]

The FMFO industry is driving the overexploitation of key fish populations[341] in the region, to the detriment of local livelihoods and food security.[342] The main species captured for FMFO are the round and flat sardinellas and bonga, which are critical to the livelihoods of fishing communities – particularly in Senegal and The Gambia – while maintaining food security across the region, especially for the most vulnerable groups. An investigation by Changing Markets revealed the combined catch of just one of The Gambia's FMFO plants accounted for approximately 40% of the country's total reported fish catches in 2016. Environmental and social issues abound – industrial effluent and air pollution from fishmeal factories is allegedly linked to the death of fish in adjacent water bodies, as well as increased rates of chronic illness and respiratory disorders in local communities.[343,344,345]

Mauritania is by far the largest producer of FMFO in West Africa and is among the top ten exporters of FMFO globally.[346] In 2018, 340,000 tonnes of sardinellas were processed into fishmeal and fish oil,[347] representing 87% of the total catch.[348] Although the Mauritanian government pledged to phase out FMFO production from whole fish by 2020, production has instead tripled within a decade.[349] The number of FMFO factories increased from just five in 2010 to 35 in 2019,[350] driving up average fish prices from US$95 per tonne in the early 2010s to over US$400 today. A recent FAO assessment found that overexploitation of sardinellas and bonga by the fishmeal industry in northwest Africa is having a "significant impact on regional food security", and called for sardinella catches to be halved as a matter of urgency.[351]

In Senegal, fish contributes around 70% of animal protein intake.[352] Coastal fisheries provide direct employment for around 58,000 small-scale fishers and 40,000 fish processors (mainly women), with an estimated 825,000 people relying directly or indirectly on fisheries for at least part of their income.[353] However, catches of staple fish are increasingly diverted to Senegal's fishmeal factories (which numbered eight in 2019), reducing fish availability and affordability.[354,355] FMFO production threatens the supply of fish relative to demand, with a projected shortfall of 150,000 tonnes of fish expected this decade in Senegal alone.[356]

China and the EU are major markets for FMFO from Mauritania, Senegal and The Gambia. In 2020, over 70% of fish oil exported from these countries was destined for the EU; the leading importers being France, Denmark and Spain.[357] The majority of fishmeal exports (68%) were destined for China, with Turkey and Viet Nam also important markets in 2020.[358]

BOX 15: SHRIMP FARMING IN ASIA

The farmed shrimp industry has shown consistent growth in recent decades, with an annual value of US$38.4 billion.[359] It is estimated that five million tonnes of farmed shrimp is produced annually, meaning that more now derives from aquaculture than is wild caught.[360]

The Asian continent is the epicentre of the global shrimp farming industry, with five of the six largest producer countries based in the region (China, India, Indonesia, Thailand and Viet Nam), collectively responsible for 79.6% of farmed shrimp production in 2018.[361]

In order to sustain this growth, a steady supply of wild caught fish for feed is required. In India – which accounted for 18% of the total volume of tropical shrimp imports into the EU in 2017 – between 45 and 60 fishmeal plants were in operation in 2020, processing an estimated 1.25 million tonnes of wild caught fish annually.[362] To meet this demand, fishing vessels engage in illegal practices, using undersized mesh nets to capture juvenile fish and species not previously targeted for fishing, and violating fishing bans aimed at giving marine ecosystems an opportunity to recover. Populations of species traditionally used for FMFO, such as sardines, have reportedly collapsed, resulting in some FMFO plants no longer operating due to a shortage of catches.[363]

Elsewhere on the continent, the growth of aquaculture has caused massive destruction of mangrove forests. Globally, 62% of mangrove losses between 2000 and 2016 were caused by conversion to aquaculture and agriculture, with shrimp farming a major driver. Of this, 80% occurred in just six South-East Asian countries:

Indonesia, Myanmar, Malaysia, the Philippines, Thailand and Viet Nam.[364] Mangroves are of vital local and global importance, serving as breeding and nursery grounds for an array of species, supporting communities who rely on capture fisheries for nutrition and livelihood, and lessening the impact of storm surges, which are becoming more frequent with global heating (see **Section 3**). Mangroves are also hugely important carbon sinks, storing up to four times more carbon per hectare than terrestrial tropical forests[365] (see **Section 2**).

The premise of catching fish for feed is deeply flawed. A key source of local nutrition is converted to fishmeal at a rate of around five kilograms of wild fish to just one kilogram of fishmeal. With high levels of mortality in aquaculture operations, much of these critical resources are in fact wasted – in Scottish salmon farms, for example, around one-quarter of the fish die prematurely.[366] In Norway – the leading importer of fish oil globally – more than 50 million captive salmon died in the final stage of production in marine cages in 2019, an increase of 27.8% over five years.[367]

The FMFO industry is plundering our ocean and depriving vulnerable populations of food security and nutrition. The capture and use of whole, wild caught fish in the Global South to feed farmed fish for sale in the Global North is deeply unjust and unsustainable: concerted efforts must be made across industry and government to bring this damaging practice to an end.

RECOMMENDATIONS

- Phase out the capture of wild fish for FMFO by implementing laws and policies that prioritise the direct human consumption of whole fish from wild capture fisheries; ruling out the establishment of new fishmeal operations; and ending the licensing of targeted fishing activities for FMFO production.
- Immediately halt the expansion of FMFO processing plants in regions where critically overfished fisheries are depended on for local food security and livelihoods, with support from international partners to sustainably rebuild fish populations.
- Retailers and the aquaculture industry in the Global North should aim to phase out farmed seafood fed on fishmeal from wild-capture fisheries, while enshrining transparency throughout their supply chains and implementing robust due diligence measures to ensure effective oversight and compliance with human rights, labour, animal welfare and environmental standards.
- Strive towards the establishment of regional fisheries management organisations (RFMOs) or other regional arrangements for small pelagic fish populations in West Africa, which currently fall outside of RFMO remits.

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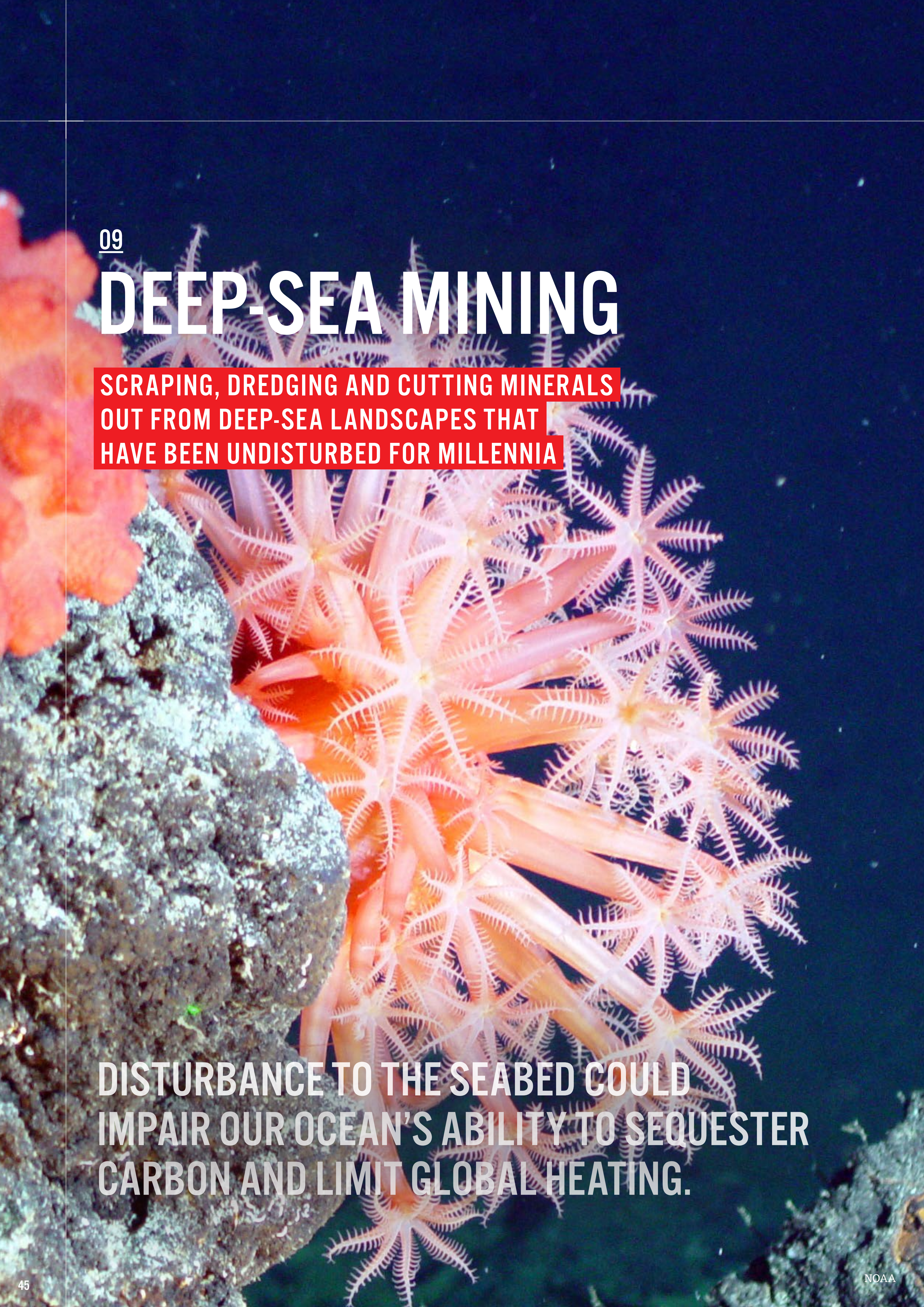


09

DEEP-SEA MINING

SCRAPING, DREDGING AND CUTTING MINERALS OUT FROM DEEP-SEA LANDSCAPES THAT HAVE BEEN UNDISTURBED FOR MILLENNIA

DISTURBANCE TO THE SEABED COULD IMPAIR OUR OCEAN'S ABILITY TO SEQUESTER CARBON AND LIMIT GLOBAL HEATING.

NOAA

The deep sea – ocean areas below 200 metres – remains a pristine ecosystem that has been largely untouched by human activity. It is enormous in size, covering 65% of the Earth's surface and making up more than 95% of the Earth's biosphere.[368] Its biodiversity remains almost entirely unknown to science, but is believed to be as rich as that of tropical rainforests.[369] The relevance of its ecosystem services cannot be understated: the deep sea contains the very foundation of oceanic food webs and is crucial for global climate regulation.

Yet, this major pillar of life is threatened by the introduction of deep-sea mining. This practice of mineral extraction – which could become the largest mining operation in history[370] – threatens to significantly disturb the delicate environment of the deep sea, with potentially devastating consequences for life on earth.[371]

Proponents argue that deep-sea mining is necessary to support the energy transition to a low carbon economy in the fight against global heating.[372] Minerals such as nickel, manganese and cobalt are in high and growing demand, used in technologies that will help shift dependence away from fossil fuels, such as batteries to power electric vehicles and store wind and solar energy. In the depths of our ocean, vast deposits of these minerals lie in the form of metal-rich crusts, polymetallic nodules and sulphides that form around vents of superheated water. Whilst all of these sources have garnered interest from those wishing to exploit the deep sea, it is polymetallic nodules that currently lie at the centre of the deep-sea mining issue. Vast fields are located in the Clarion-Clipperton Zone (CCZ), where 17 exploration licences have been issued by the International Seabed Authority for the potential collection of polymetallic nodules.[373]

The body responsible for decisions on deep-sea mining, the International Seabed Authority (ISA), has so far issued 31 licences for exploration of the seabed,[374] equating to over 1.3 million square km[375] – more than twice the size of France. However, as mining companies make the case for deep-sea mining to go ahead, experts are calling for caution,[376] warning of the potentially irreversible devastation that this could impose on our ocean.

In July 2021, the Pacific Island nation of Nauru triggered the 'two-year rule', which gives the ISA two years to finalise rules and regulations for mining. Despite knowing almost nothing about the environmental consequences, deep-sea mining could commence even if these rules are not yet agreed upon.[377]

THE DEEP SEA

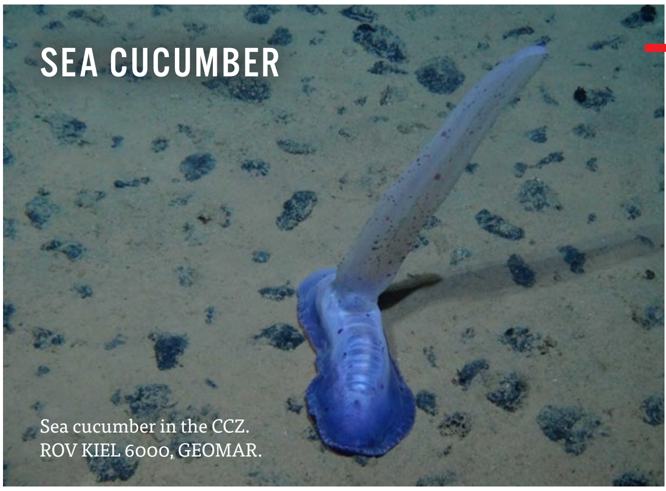
Stretching to depths of up to 11,000 metres, the deep sea is the most unexplored and unknown part of our planet. Despite covering 71% of the Earth, we have only charted and explored 5% of the ocean.[378] The deep sea, which represents two thirds of the Earth's surface,[379] makes up the majority of this uncharted area.

The depths of the ocean contain some of the most undisturbed and mysterious ecosystems on the planet. Deep below the surface, varied landscapes of plains and hydrothermal vents, seamounts and canyons, are home to rich and unknown wildlife. Within the small portions of the deep sea where humans have ventured, the vast majority of species collected are new to science,[380] including some that may not be found anywhere else in the ocean.[381] It is estimated that there are 2.2 million marine species in existence, 91% of which are not yet described or even discovered.[382]

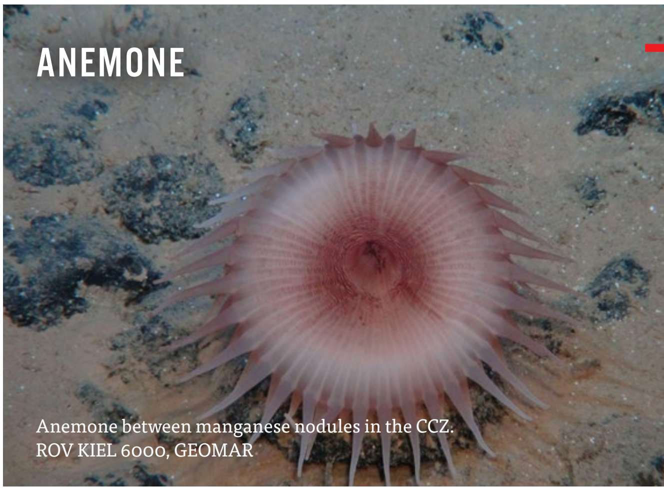
This biodiversity is abundant in areas sought-after by deep-sea mining proponents. Hydrothermal vents, around which sulphides containing rare minerals form, support a myriad of marine life, including the first species in the deep sea to be classified as endangered – the scaly-foot snail.[383] Seamounts – where metal-rich crusts would be harvested – are littered with corals, sponges and filter feeders;[384] these highly productive areas also provide key aggregation, breeding, foraging and resting areas for emblematic species such as whales, sharks, turtles and seals,[385,386] while serving as a navigational aid during species migrations.[387] Owing to its biodiversity, the deep sea may contain critical future pharmacological discoveries. Deep-sea organisms have been found to possess compounds with antimicrobial activity that could be used to develop treatments for cancer, infectious diseases and other illnesses.[388]

Deep-sea mining would obliterate sensitive habitats; polymetallic nodules, for example, provide the only hard substrate on vast seafloor plains, providing attachment points for species such as sponges and molluscs not found elsewhere and which act as important and unique habitats for other wildlife.[389,390,391] The removal of polymetallic nodules is predicted to cause severe disruption to deep-sea biodiversity, potentially eliminating up to one-fifth of taxa and almost one-third of links within ecosystem food chains.[392]

The ocean, and the deep ocean specifically, plays a vital role in regulating the climate. The deep sea stores vast amounts of carbon in its sediment – the top one metre of the seafloor may store almost twice the amount of carbon stored in terrestrial soils[393] and up to five times more carbon than ocean sediments in shallow waters.[394] This carbon has accumulated over tens of thousands of years and will be locked away safely for generations to come if left undisturbed.[395] As well as being hotspots for biodiversity in the deep sea, hydrothermal vents also support massive phytoplankton blooms in surface waters, boosting CO_2 capture.[396]



Sea cucumber in the CCZ.
ROV KIEL 6000, GEOMAR.

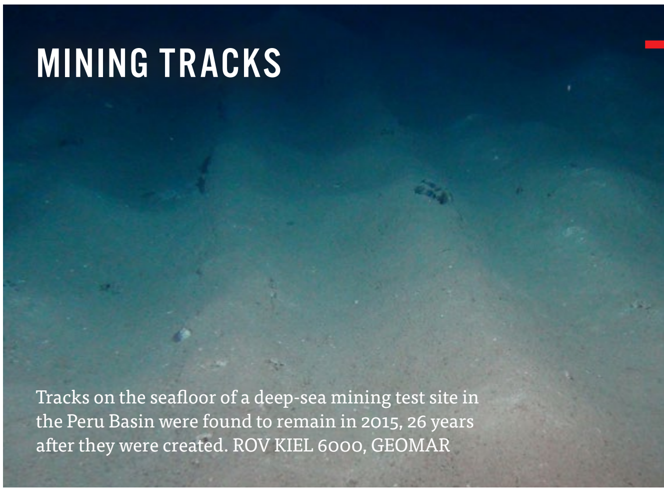


Anemone between manganese nodules in the CCZ.
ROV KIEL 6000, GEOMAR

Highly diverse coral environments like this one were found throughout Dive 19 of the NOAA's 2021 North Atlantic Stepping Stones expedition. NOAA.

Hyalonema obtusum sponge with anemones attached to its stalk. The sponge itself is attached by the stalk to a polymetallic nodule in the Clarion-Clipperton Zone. ROV KIEL 6000, GEOMAR

ROV KIEL 6000 holding a manganese nodule with sponge attached.
ROV KIEL 6000, GEOMAR



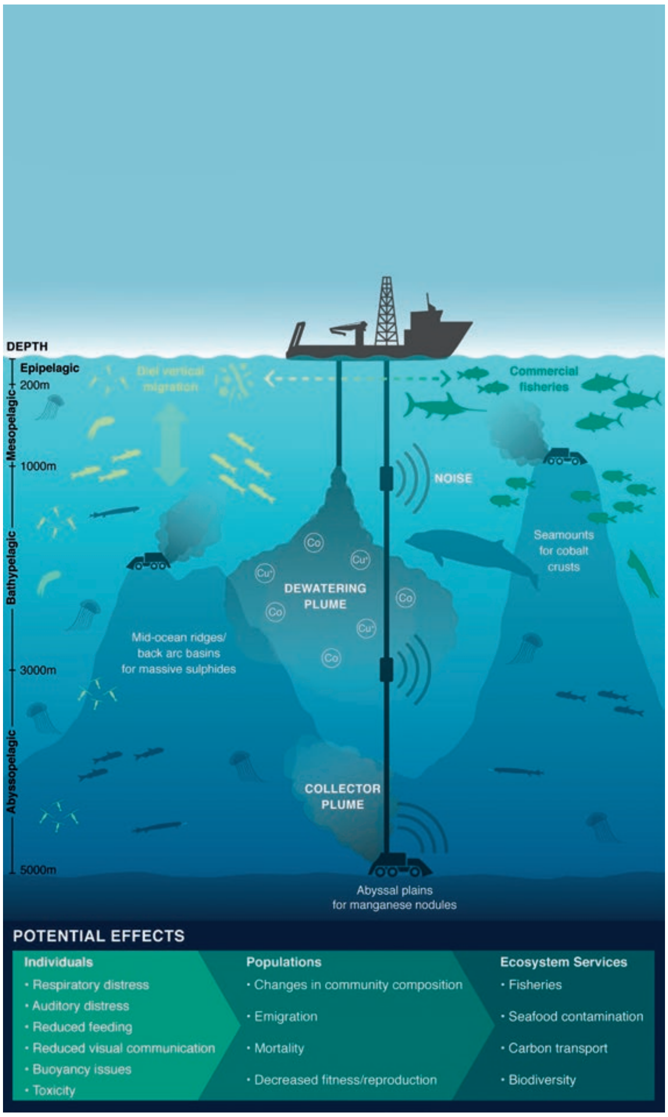
Tracks on the seafloor of a deep-sea mining test site in the Peru Basin were found to remain in 2015, 26 years after they were created. ROV KIEL 6000, GEOMAR

OUT OF OUR DEPTH

"IN SHORT, THE MORE SCIENTISTS LEARN ABOUT DEEP-OCEAN ECOSYSTEMS, THE MORE CONCERNED THEY BECOME ABOUT THE MAGNITUDE OF THE ENVIRONMENTAL IMPACTS OF SEABED MINING." JAECKEL (2020)[397]

Deep-sea mining would involve scraping, dredging and cutting minerals out from deep sea landscapes that have been undisturbed for millennia. Long pipes would be installed to transfer exploited minerals to the surface, with unwanted water and sediment discarded back into the ocean. Each deep-sea mining operation is projected to effectively strip mine 8,000 to 9,000 square km of seabed over the course of a 30-year licence.[398] Currently, there is a recognised, marked lack of research to allow for sufficient understanding of the ecological impact of these processes.[399]

"HOW CAN WE IN OUR RIGHT MINDS SAY LET'S GO MINING WITHOUT KNOWING WHAT THE RISKS ARE?" SURANGEL WHIPPS JR, PRESIDENT OF PALAU[400]



Deep-sea mining processes and impacts. Midwater ecosystems must be considered when evaluating environmental risks of deep-sea mining.[401] Drazen, J. C. et al (2020)

The harm to deep-sea ecosystems, and the wider ocean, will be incalculable and unavoidable, adding to existing pressures from pollution, overfishing and global heating.[402] Deep-sea mining will very likely lead to an overall loss of biodiversity,[403,404] and impact huge swathes of the ocean: disturbance from a single mining operation could be two to four times greater than its direct mining footprint, impacting up to 32,000 square kilometres over 20 years[405] – an area greater than the size of Belgium. Scientists predict the long-term and even irreversible loss of ecosystem functions[406] – at the site of a 1989 deep-sea mining experiment in the Peru Basin, biodiversity had not yet recovered from nodule mining after 26 years.[407]

Some deep-sea species are particularly vulnerable to physical disturbance owing to their slow growth rates and low fecundity. The Greenland shark, for instance, which dives to around 1,200 metres, reaches maturity at around 150 years with a lifespan of at least 270 years,[408,409] and shares its range with hydrothermal vents that present potential for deep-sea mining.[410,411,412,413] Whilst the extent of impacts of deep-sea mining on sensitive species like these are not yet understood, this uncertainty itself necessitates caution against this disruptive practice.

Deep-sea species are expected to be severely impacted by the light and noise pollution generated by deep-sea mining – noise from a single mining operation may reverberate for 500 kilometres, interfering with species' ability to communicate and detect prey and predators,[414] disturbing endangered migratory whales.[415] Sediment plumes will not only smother fragile wildlife adjacent to mining operations,[416,417] but are likely to have myriad negative effects in the midwater column, introducing metal contaminants into key commercial fisheries such as tuna, which are also critical to livelihoods, and disrupting species that filter sediments from the water, which form the basis of oceanic food webs.[418] Deep midwater ecosystems contain fish biomass 100 times greater than the global annual fish catch,[419] and are key in the ocean's capacity to sequester carbon.[420]

Paradoxically, given the purported climate agenda driving the race to begin mining, disturbance to the seabed could impair our ocean's ability to sequester carbon and limit global heating. Deep-sea mining could obliterate bacteria that sequester carbon[421] (**Box 16**) while triggering the release of carbon stored in deep-sea sediments.[422]

The limited research to date has shown long-term damage to carbon cycling in the seabed – in one study, carbon flows through the food chain remained weakened after 26 years, even with relatively small-scale sediment disturbance.[423]

BOX 16: THE CLARION-CLIPPERTON ZONE (CCZ)

One of the areas most sought after for mining exploration is an area of the Pacific larger than the European Union known as the Clarion-Clipperton Fracture Zone or Clarion-Clipperton Zone (CCZ). Around 4.5 million square kilometres in size, the CCZ is host to trillions of polymetallic nodules.[424] It is estimated to hold six times more cobalt and three times more nickel than all known terrestrial deposits, as well as significant stores of other valuable metals like manganese and copper.[425] At least 17 exploration licences have been issued for this area, despite there being next to no knowledge about the ecosystems in the depths of the CCZ and the damage that could be inflicted by deep-sea mining.

Scientists estimate that we have only sampled 0.01% of the CCZ,[426] with 70-90% of species found in the region completely new to science.[427] Even at sites already visited, species richness estimators predict that 25-75% of species remain to be collected.[428] This hub of biodiversity and scientific discovery also contributes to carbon cycling and storage. Whilst the mechanisms of this process are not yet understood, fauna in nodule fields play a role in carbon fixation.[429] In the CCZ specifically, bacteria have been discovered that actively consume CO2 and convert it to biomass.[430] If the presence of this bacteria is scaled up across the global sea, it could be absorbing 10% of all carbon sequestered by the ocean.[431]

In spite of its clear and critical importance, deep-sea mining could commence in the CCZ as early as July 2023. This will cause damage to ecosystems that we do not yet understand, endanger species not yet discovered, and risk throwing our oceans into a crisis we are not prepared for. The international community must throw its full weight behind preventing this potentially catastrophic endeavour.

DEEP-SEA MINING IS NOT AN IMPERATIVE

"A TRANSITION TOWARDS A 100% RENEWABLE ENERGY SUPPLY CAN TAKE PLACE WITHOUT DEEP-SEA MINING" INSTITUTE FOR SUSTAINABLE FUTURES[432]

According to the International Energy Agency, global efforts to reach the goals of the Paris Agreement would mean a quadrupling of mineral requirements for clean energy technologies by 2040.[433] Such projections, however, often assume the continued use of current lithium-ion battery technology (which depends on cobalt and nickel).[434] Yet, alternatives that do not require metals currently targeted for deep-sea mining[435,436] are already under development and in some cases, in use, such as lithium iron phosphate batteries promoted by Samsung, Tesla, Panasonic[437] and Volkswagen.[438] With battery technology rapidly evolving, it is almost impossible to forecast which technologies will be most used up to 2050.[439]

There is an acute risk that deep-sea mining will create a self-fulfilling prophecy, increasing in intensity in response to demand and sidelining investment into sustainable solutions. Instead, we must reduce demand for virgin metals and build a circular economy – extending product life cycles, introducing the right to repair, and scaling up systems for reuse and recycling. Recycling can play a major role in reducing primary demand for battery metals used in electric vehicles,[440,441] which can be expanded to metals not currently recovered, or recovered only at low rates.[442] Likewise, primary demand for metals for solar panels can be reduced through improved efficiency of material use, given the long lifespan of these products.[443]

"BETWEEN 25-55% OF PROJECTED DEMAND FOR [ELECTRIC VEHICLE] BATTERIES OVER THE NEXT TWO DECADES COULD BE OFFSET BY OPTIMIZING BATTERY METAL RECOVERY... [R]ECOVERY RATES OF ABOVE 90% ARE TECHNOLOGICALLY FEASIBLE FOR ALL FOUR METALS [COPPER, LITHIUM, NICKEL AND COBALT.]" DOMINISH ET AL. (2021)[444]

NOAA

Deep-sea mining proponents have repeatedly pointed out the social advantages over terrestrial mining.[445] Terrestrial mining indeed has negative environmental and social impacts – including pollution, heavy metal contamination of water and soils, adverse health effects for workers and neighbouring communities[446] – while being implicated in human rights abuses such as child labour.[447] However, expanding mining activities into deep-sea areas of unparalleled fragility, vulnerability and biodiversity, where risks are high and impacts likely irreversible, simply cannot be the solution.[448] Rather, the emphasis should be placed on promoting energy efficiency and circular models of production and consumption, and any expansion or intensification of terrestrial mining must be carefully considered and take place within significantly improved and fully enforced environmental, social and governance (ESG) frameworks. Emphasis must also be placed on responsible sourcing through verified certification schemes[449] and legal requirements for robust supply chain due diligence[450], and the wider use of low-impact methods promoted.

OPPOSITION IS BUILDING

The race to mine the deep ocean is increasingly opposed by nations around the globe. At the UN Ocean Conference 2022, Palau and Fiji launched the Alliance of Countries Calling for a Deep-Sea Mining Moratorium[451], which also counts Samoa and the Federated States of Micronesia as members.[452] To date, 14 states have officially taken positions against deep-sea mining in international waters,[453] with Chile, for example, calling for a 15-year extension for the formulation of deep-sea mining regulations[454] and France calling for a complete ban on deep-sea mining.[455] In October 2022, the German government announced it would not support any deep-sea mining activities until their impacts are sufficiently understood.[456]

To date, more than 250 parliamentarians from over 50 countries have signed a declaration calling for a moratorium and reform of the ISA.[457] More than 700 scientists have also called for a pause to deep-sea mining until sufficient and robust scientific knowledge is gathered.[458] Meanwhile, companies such as Volvo, the BMW Group, Samsung, Google and Volkswagen have committed not to use minerals sourced from the deep ocean,[459] casting serious doubt on the business case for deep-sea mining.

STANDING ON THE BRINK OF DISASTER

The crux of the deep-sea mining issue is the lack of robust, comprehensive and credible scientific baseline knowledge of deep-sea ecosystems or deep-sea mining technology. Without these baseline studies, it is impossible to fully understand or mitigate the environmental risks of deep-sea mining; protect communities from the socio-economic impacts; or ensure that the climate is not impacted. There currently are no solid baseline studies evaluating the full carbon cycle impacts, including emissions, of the deep-sea mining industry.[460]

Deep-sea mining would wipe out ocean ecosystems and unique species before we even have a chance to understand them. Worryingly, the body charged with managing the international seabed for the "benefit of humankind as a whole"[461] – the ISA – is unfit for purpose, more concerned with granting licences than protecting the deep sea.[462,463] Current proposals to mine the deep ocean would enrich a handful of companies[464,465] in the short-term, yet cost us all – with untold and enduring impacts on ocean stability and the communities who depend on a healthy ocean for their food and livelihoods.[466]

It is up to governments to stand up for the shared future of humanity, and for life on Earth, and take action to stop deep-sea mining. International cooperation must be strengthened to protect the deep sea, particularly in areas outside of national jurisdiction, and the ISA reformed to ensure transparency and address conflicts of interest.

RECOMMENDATIONS

- Invest in scientific exploration and research of deep-sea environments to improve understanding of these ecosystems and the impacts of human activity in the deep sea, including the implications for carbon storage (see **Section 2**), global heating, biodiversity loss and global fisheries.
- Advocate and take action to stop and prevent deep-sea mining, in line with the precautionary principle. Push for governance reform and stronger oversight of the deep-sea mining industry, including the reform of the ISA to ensure transparency and address conflicts of interest.
- Work to formally adopt and ratify the UN High Seas Treaty as soon as possible and intensify international cooperation to secure its urgent and effective implementation, including the rapid designation of a comprehensive network of MPAs in areas beyond national jurisdiction with high standards of protection for marine biodiversity and ecosystems (see **Section 4**).

10

MARINE POLLUTION - PLASTICS AND GHOST GEAR

PLASTIC BOTTLES, BAGS, CUPS AND OTHER FORMS OF PACKAGING ARE CHOKING THE ENVIRONMENT

APPROXIMATELY 10-20 MILLION TONNES OF PLASTIC END UP IN THE OCEAN EACH YEAR – ROUGHLY A LORRY LOAD OF RUBBISH EVERY MINUTE.

Since its invention in the early 20th century, over 8.3 billion tonnes of new, so-called 'virgin', plastic has been manufactured – equivalent to around 822,000 Eiffel towers – with a huge increase in production in the last 20 years.[467] In 2020 alone, 367 million tonnes were produced,[468] and if current growth rates continue unchecked, plastic use could nearly triple from 2019 levels by 2060.[469]

Alarmingly, half of plastic produced is designed for single-use, to be used for just minutes and thrown away.[470] This equates to approximately 190 million tonnes each year,[471] weighing the same as around 15 million double-decker buses. Around the world, one million plastic bottles are purchased every minute, and up to five trillion plastic bags are used every year.[472] Plastic bottles, bags, cups and other forms of packaging are choking the environment and driving global heating, with 99% of plastics made with chemicals derived from fossil fuels.[473]

The waste associated with plastic production on this scale is vast. By 2015, 6.3 billion tonnes of plastic had been discarded as waste – of this, less than 10% was recycled while more than 75% had found its way to landfills, natural habitats, rivers and our ocean.[474] Because plastics do not biodegrade, this means virtually every piece of plastic produced between 1950 and today still exists,[475] often in the form of microplastics (less than 5mm in size) and nanoplastics (smaller than a single cell), which contain a cocktail of toxic compounds and additives.

These particles are released into our environment, find their way into food,[476] water,[477,478] the air[479] and are consumed by living organisms, causing unknown harm to humans and animals. The average person ingests around 2000 tiny pieces of plastic weighing around five grams every week, equivalent to a credit card in our wallet,[480] and traces of plastic pollution have even been found in human blood.[481] Recent research detected microplastics in the breast milk of 75% of women in a test group,[482] two years after the discovery of traces of plastic in the placentas of newborn babies.[483]

Of the estimated 10,000+ substances (monomers, additives and processing aids)[484] used in plastic production, many are extremely harmful – Bisphenol A, for example, has been linked to cancer, reproductive and developmental problems.[485]

Plastic pollution can now be found at the top of Mount Everest[486] and in the deepest depths of our ocean.[487] It is rapidly becoming one of the greatest planetary threats of our time, damaging the health of our land and ocean ecosystems, harming humans and wildlife, and exacerbating the climate crisis.

AN OCEAN OF PLASTIC

An estimated 10-20 million tonnes of plastics end up in the ocean every single year, causing approximately US$13 billion in environmental damage, including losses to fisheries and tourism.[488] This volume is roughly equivalent to emptying a lorry load of rubbish into the ocean every minute. If no action is taken, the amount of plastic currently entering the ocean annually will triple in the next 20 years,[489] meaning there could be more plastics in our ocean by weight than fish in the year 2050.[490]

Plastic accounts for the vast majority of all marine debris,[491] accounting for at least 85% of total marine waste.[492] It is estimated there are at least 5.25 trillion plastic particles floating in our seas, weighing a combined 269,000 tonnes.[493] While large accumulations of plastic, such as the 'Great Pacific Garbage Patch', are well documented,[494] 99% of plastic waste in our ocean remains unaccounted for,[495] ending up deep in the water column, on the seafloor and in coastal zones, negatively impacting coastal communities.[496]

At least 10% of global marine debris is thought to be fishing gear. It is estimated that between 500,000 and 1 million tonnes of fishing gear enters our ocean every year.[497] This 'ghost gear' – fishing equipment lost or discarded at sea – can remain in the ocean for decades, entangling sea turtles, dolphins, whales, seabirds and other marine wildlife, which die a slow and painful death through suffocation, starvation or exhaustion.[498] According to World Animal Protection, abandoned nets kill an estimated 136,000 seals, sea lions and whales every year.[499] Meanwhile, a 2016 study of marine plastic impacts on wildlife found that 45% of species listed on the IUCN red list of threatened species had been reported to have interactions with marine plastics, including ingestion or entanglement in ghost gears. Ghost gear also smothers marine habitats such as coral reefs and seagrass beds,[500] destroys marine vegetation, causes sediment build-up, and prevents marine creatures from accessing key habitats.

Currently, there remains a lack of international regulations that specifically focus on preventing ghost gear from entering our ocean. Existing measures – such as the FAO's voluntary gear-marking guidelines[501] and targets set out in the European Green Deal[502] – are vague and non-binding.

Many countries also lack proper disposal and waste management systems for fishing gear. In fishing communities across Thailand (see **Box 17**), where the domestic fishing fleet contains almost 57,000 vessels,[503] artisanal fishers often burn their old nets in the absence of any disposal or recycling scheme, harming both the environment and human health through the release of toxic fumes.[504]

BOX 17: NET FREE SEAS

Since July 2020, over 100 fishing communities across Thailand have joined EJF's Net Free Seas recycling programme. Fisherfolk collect the nets, clean them and prepare them for recycling. So far, the communities have removed 70 tonnes of discarded plastic fishing nets from the ocean generating over US$23,000 in alternative income. The nets have been recycled by domestic recyclers to make over 100,000 lifestyle and industrial component items – including visors for COVID-19 protection. The money from the nets is either paid into a fund for the relevant village, used towards projects benefiting the community or given to individuals as they present the nets for recycling – each community decides on their own model. The Net Free Seas programme is currently being piloted in fishing communities in Ghana and Indonesia.

UNDER THREAT

Marine plastics are a serious threat to ocean life.[505] From ingestion to entanglement, all species of sea turtle and more than half of all marine mammal and seabird species have been negatively impacted by marine debris, with 92% of all recorded encounters between marine organisms and debris having been with plastic.[506] Up to one million seabirds and 100,000 marine mammals are killed every year as a result of plastic waste.[507]

The ocean is the largest carbon sink on the planet but can only continue to function as such if its ecosystems are permitted to thrive. There is now evidence that phytoplankton and zooplankton – the foundation of all ocean food chains and key pillars of the ocean's carbon cycle – are also ingesting plastic particles that could inhibit their functioning and role in oceanic carbon fixation/sequestration.[508,509] Research further suggests that the break-down of plastics in the ocean and under sunlight may also release greenhouse gases,[510] directly contributing to the climate crisis.

THE PLASTIC LIFECYCLE

Ending the crisis in plastic pollution and its associated threats requires us to drastically alter the way we produce, use, and dispose of plastic to protect marine life.

Very little 'virgin' plastic is recycled – the global recycling rate currently sits at less than 10%.[511] Additives vary greatly between plastics – giving items different colours or flexibility – making recycling an incredibly complex task. Even when plastic is recycled, there is no easy way to separate harmful additives and chemicals during recycling, meaning they remain throughout the life of the plastic and eventually leach into the environment.

The plastic industry has known about the difficulties of recycling since the 1970s but has continued to sell the public on the idea that the majority of plastic could be, and would be, recycled – all while making billions of dollars selling the world new plastic.[512,513] By encouraging the public to believe recycling is working, people are less concerned about the issue of plastic pollution and less likely to reduce their plastic use.

With plastic use at an all-time high and true rates of recycling shockingly low, the issue of where plastics end up has become a matter of North-South inequality and environmental injustice. Industrialised nations export their plastic waste to low-income countries which generally lack the resources and facilities for adequate recycling or even waste management. Nearly three-quarters of global plastic waste exports originate in just 15 countries, of which 11 are OECD countries and responsible for over 55% of scrap plastic exported in 2017.[514] With few other options, unrecyclable plastics are burned in low-income countries, releasing plumes of highly toxic chemicals. Following China's move to ban the import of scrap plastic in 2018, flows of plastic waste were diverted to Malaysia, Viet Nam and Turkey,[515] some of which, in turn, have also announced import bans on plastic waste.[516]

The trade in plastic waste from high- to low-income countries is adding to global inequality while failing to address the underlying pollution crisis. Not only does exporting plastic waste fail to address the issue, it uses still more fossil fuels and produces more emissions during shipping. At no point in this 'pass the parcel of plastic pollution' do manufacturers shoulder responsibility for the environmental damage they are causing, nor will they until there is an economic incentive to do so. Until the 'polluter pays' principle is enforced for plastic manufacturers, we can expect further greenwashing and creative marketing.

“PEOPLE ARE UNDERSTANDING THAT TO CHUCK PLASTIC INTO THE OCEAN IS AN INSULT. TO HAVE THE NERVE TO SAY: ‘THIS IS OUR RUBBISH. WE’LL GIVE YOU MONEY AND YOU CAN SPREAD IT ON YOUR LAND INSTEAD OF OURS, IN THE FAR EAST’ IS INTOLERABLE.” DAVID ATTENBOROUGH[517]

THE WAY FORWARD

Addressing the plastic waste crisis will require the system-wide adoption of rigorously enforced policies for plastic reduction and the transitioning toward a circular economy, supported by fiscal and monetary policy. The circular economy is a model of production and consumption that involves sharing, repairing, and recycling existing materials and products as long as possible,[518] effectively seeking to ‘design out’ waste and pollution and regenerate the Earth’s natural systems.

The international community has recognised the need to act on these issues. The SDGs, for example, include a number of relevant targets, including the need to “prevent and significantly reduce marine pollution of all kinds” by 2025, and “achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil” by 2020. However, the latter deadline has already been missed.

By 2019, 141 countries had implemented direct action on plastics with tax levies and bans,[519] among them China, Bangladesh, India and 34 African countries.[520] The European Union has taken the lead with its 2019 Single-Use Plastics Directive and the European Green Deal, while also stating its intention to call for a globally binding agreement enshrining a circular, life-cycle approach to plastics.[521] In addition, 63 brand and retail companies, which represent 20% of all plastic packaging, have committed to reducing their virgin plastic use under the Global Commitment, with 2021 showing improvements for the second consecutive year.[522]

In March 2022, at the United Nations Environment Assembly (UNEA), world leaders, environment ministers and other representatives from 173 countries agreed to end plastic pollution and develop a legally binding treaty on plastics by 2024 – a truly historic moment.[523] The resolution calls for a treaty covering the “full lifecycle” of plastics, from production to disposal, and will be negotiated over the next two years. Progress is being made, and it seems the political will is there, but governments and industry now need to come together to agree on a binding global agreement by 2024 that will end our dependence on plastics.

RECOMMENDATIONS

- Support the establishment of a new, legally binding United Nations treaty on plastic pollution to prevent and remediate plastic pollution and its toxic impacts through measures across the entire plastics lifecycle.
- Implement policies to end the use of single-use plastic and require manufacturers to pay the full cost of dealing with plastic packaging once it becomes waste, creating an economic incentive to decrease production and drive improvements in plastic waste management. Hold plastic producers accountable for plastic pollution by requiring full transparency from companies on their plastic use, plastic pollution, and associated greenhouse gas emissions.
- Increase regulation around the global practice of offshoring plastic waste from industrialised to middle or low-income countries, and prevent the movement of waste plastics to countries with insufficient waste management infrastructure.
- Adopt and implement a global agreement on ghost gear prevention, including mandatory gear marking guidelines and disposal regulations.
- Increase investment in the development of recycling technologies and non-plastic alternatives to accelerate the transition from linear to circular plastic production and consumption.

CONCLUSION

OUR OCEAN FACES AN UNPRECEDENTED CRISIS.

A plethora of threats – from destructive fishing to plastic pollution – are pushing it to the brink, threatening the collapse of global fisheries and jeopardising the survival of wildlife and people alike. These rich, diverse marine ecosystems are crucial in the fight against catastrophic global heating and biodiversity loss, and central to our ability to ensure the human rights of billions of people who depend on our seas.

This manifesto presents a roadmap for the transformational change needed to stave off the worst impacts of this crisis, redefining our relationship with our ocean and prioritising the rights and livelihoods of local and Indigenous communities over the greed of the handful of actors who would see the collapse of critical ecosystems for their own profits.

Protecting and restoring the ocean today will prevent inordinate suffering and economic losses for generations to come by safeguarding the invaluable marine life that underpins climate stability, food security and livelihoods for people across the globe.

FAILURE IS NOT A VIABLE OPTION; WHAT DEFINES THE FUTURE OF THE OCEAN THAT SUSTAINS US IS HOW URGENTLY AND BOLDLY WE ACT.

Protecting People and Planet

Michele Roux / Ocean Image Bank

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