
BLUE MARINE
FOUNDATION
A BLUE VISION
FOR THE HIGH SEAS

70% OF THE LIVING SPACE ON EARTH

Much of our planet lies beyond the control of nation states and their laws. These international waters, commonly known as the high seas, cover a vast swath of ocean that takes in 43% of the surface of the planet. Their average depth is greater than 4 km and when this third dimension is accounted for, they occupy a breathtaking 70% of the living space on earth.

Professor Callum Roberts

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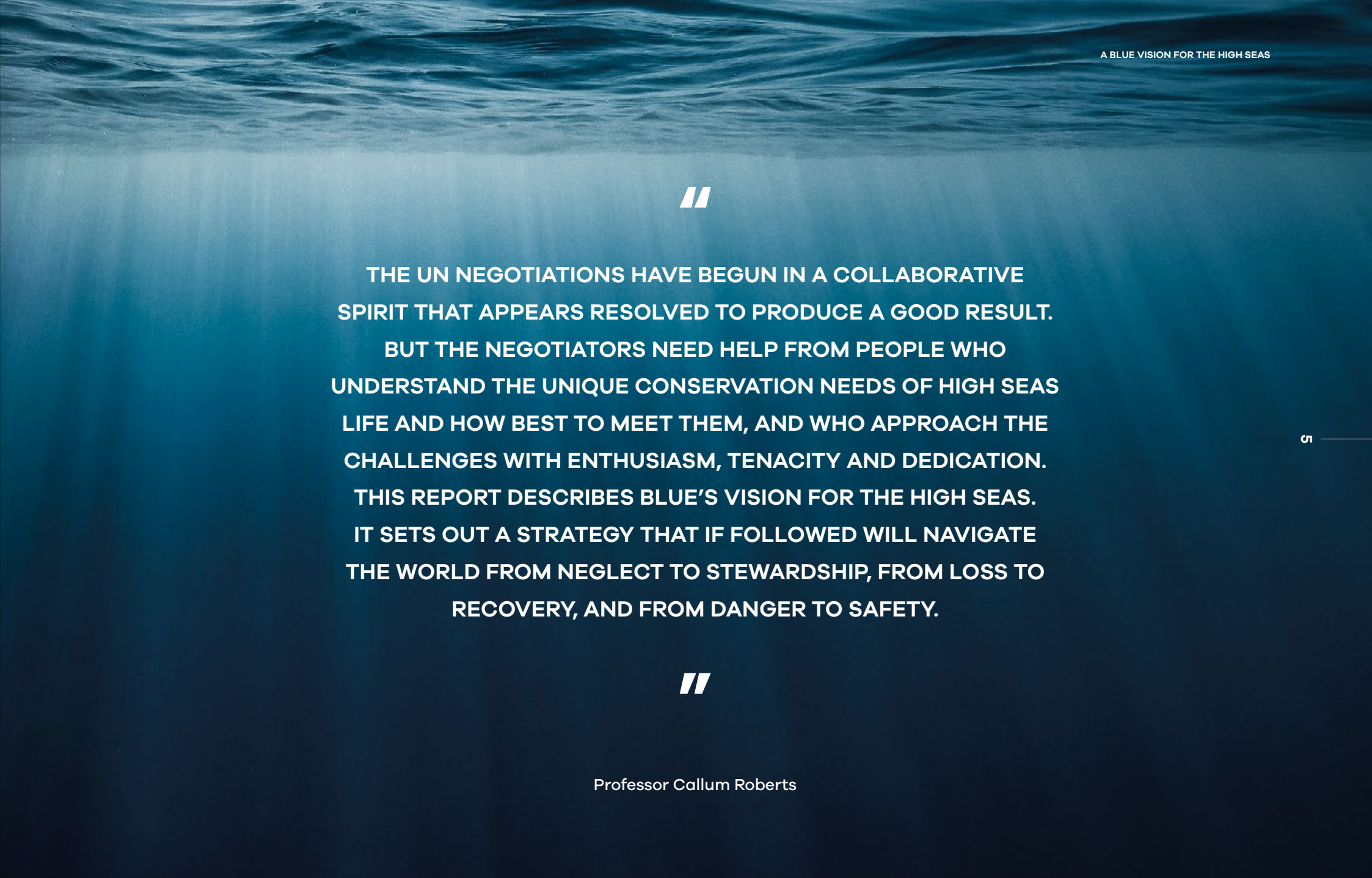

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THE UN NEGOTIATIONS HAVE BEGUN IN A COLLABORATIVE SPIRIT THAT APPEARS RESOLVED TO PRODUCE A GOOD RESULT. BUT THE NEGOTIATORS NEED HELP FROM PEOPLE WHO UNDERSTAND THE UNIQUE CONSERVATION NEEDS OF HIGH SEAS LIFE AND HOW BEST TO MEET THEM, AND WHO APPROACH THE CHALLENGES WITH ENTHUSIASM, TENACITY AND DEDICATION. THIS REPORT DESCRIBES BLUE'S VISION FOR THE HIGH SEAS. IT SETS OUT A STRATEGY THAT IF FOLLOWED WILL NAVIGATE THE WORLD FROM NEGLECT TO STEWARDSHIP, FROM LOSS TO RECOVERY, AND FROM DANGER TO SAFETY.

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Professor Callum Roberts

INTRODUCTION

Charles Clover
Executive Director
Blue Marine Foundation

When a person cares about the environment, they often refer to themselves as green. At Blue Marine Foundation, we consider ourselves BLUE. That means we care about the whole ocean and that includes the high seas, from the floating microalgae of the Sargasso Sea to the great whites that congregate at the Shark Café in the remote mid-Pacific Ocean every winter and spring.

When BLUE was founded nine years ago, our strategy was to work towards the protection of 10 per cent of the ocean by 2020. More recently our goal has become to protect 30 per cent by 2030, a scientifically-based ambition echoed by the UK government in September 2018. It is impossible to reach this target without a global, legally-binding mechanism to protect the high seas, such as the one currently under negotiation at the United Nations.

If the world can arrive at a "Paris Agreement for the Oceans," 2020 will be the year that it happens.

At the historic COP21 of the Climate Convention in Paris, it was a 'high ambition coalition' of countries that united to drive through an agreement. BLUE believes that a comparable achievement is possible in the Biodiversity Beyond National Jurisdiction negotiations and onwards towards 30 per cent of ocean protected by 2030. We also believe that the UK has a leading role to play in both defining the ambition and creating a coalition. To help catalyse that ambition, BLUE has produced a vision for the high seas.

FOREWORD

Kristina Gjerde
The International Union for
Conservation of Nature

In response to accelerating impacts on our shared ocean commons, the United Nations General Assembly has commenced negotiations for an international agreement for the conservation and sustainable use of marine biodiversity beyond national jurisdiction. Though complex, these negotiations are vital to safeguarding the many creatures, including humans, whose lives depend upon a healthy, productive and resilient ocean.

At the second of four rounds of negotiations in New York ending 5 April 2019, we witnessed steady progress on procedures for establishing marine protected areas and other spatial tools and on standards for conducting environmental impact assessments. There is good will and hope that a solution can be found to the controversial topic of whether and how to share benefits derived from marine genetic resources sourced beyond national boundaries. More nations now recognize the value of sustained financing so that all countries can participate in managing, studying and protecting our shared ocean, and the value of incorporating time-tested traditions of custodianship, inclusiveness and mutual respect.

However, to achieve the BLUE Vision so eloquently outlined herein entails a more transformative agenda. It requires accountable institutions charged with protecting ocean life and safeguarding ecosystem integrity. This calls for leaders to commit to protecting large ocean areas, to strengthening existing institutions and to lifting global capacity so that our activities are environmentally sustainable and socially just despite rapid ocean change. We have only one ocean, and this one opportunity to shift our course towards a sustainable future for all. We hope you will join us.

A VISION FOR THE HIGH SEAS

PROFESSOR CALLUM ROBERTS

MUCH OF OUR PLANET LIES BEYOND THE CONTROL OF NATION STATES AND THEIR LAWS. THESE INTERNATIONAL WATERS, COMMONLY KNOWN AS THE HIGH SEAS, COVER A VAST SWATH OF OCEAN THAT TAKES IN 43% OF THE SURFACE OF THE PLANET.

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For most of history, this world has existed at the fringes of human experience and concern. Industry concentrated close to coasts, leaving high seas wildlife little disturbed and spared from pollution. In recent years, however, activity has spread to the high seas, fuelled by population growth, technological advance, globalisation and the constant hunt for new resources. Today our influence extends to the farthest reaches of the ocean and the deepest abyss.

In the space of a few decades, the modern world has asserted itself on the high seas in frenzy of commercial activity. These waters represent a last frontier for exploitation and plunder where laws are weak, countries can opt out of the laws and rules they disagree with, and rogue operators exploit people as well as fish. This gaping chasm in governance has led to declining fish yields, seabird rookeries falling silent and turtle beaches where thousands once hauled themselves ashore, now almost empty. The means by which

high seas life is extracted are brutally efficient, industrial in intensity, and technologically sophisticated. In the absence of proper restraint, they are devastating marine riches scarcely counted, whose existence we are only just beginning to comprehend.

The high seas are threatened by more than just fishing. Growing ship traffic has increased underwater noise, the concentration of plastic pollution is rising, the world is warming, the sea acidifying and productivity and oxygen levels are in decline. Deep-sea mining is on the cusp of commercial viability with impacts known to be severe but impossible to assess properly in the little studied deep sea.

The world is at last waking up to the risks. In 2018 the United Nations convened an Intergovernmental Conference on Biodiversity Beyond National Jurisdiction with the intention that by 2020, a new Treaty will close legal loopholes by which countries exercise freedoms to exploit marine life, granted by the UN Convention on the Law of the Sea, while shirking their duties to protect and conserve it. The stakes could not be higher. This is a once-in-a-generation opportunity. If we get it wrong now, it will be decades before there is another chance. By then, in all likelihood, it will be too late.

The UN negotiations have begun in a collaborative spirit that appears resolved to produce a good result. But the negotiators need help from people who understand the unique conservation needs of high seas life and how best to meet them, and who approach the challenges with enthusiasm, tenacity and dedication. This report describes BLUE's vision for the high seas. It sets out a strategy that if followed will navigate the world from neglect to stewardship, from loss to recovery, and from danger to safety. I am proud to be trustee of an organisation that is committed to be a voice for the wildlife of the high seas and for future generations of people for whom our success today is vital for their tomorrows.

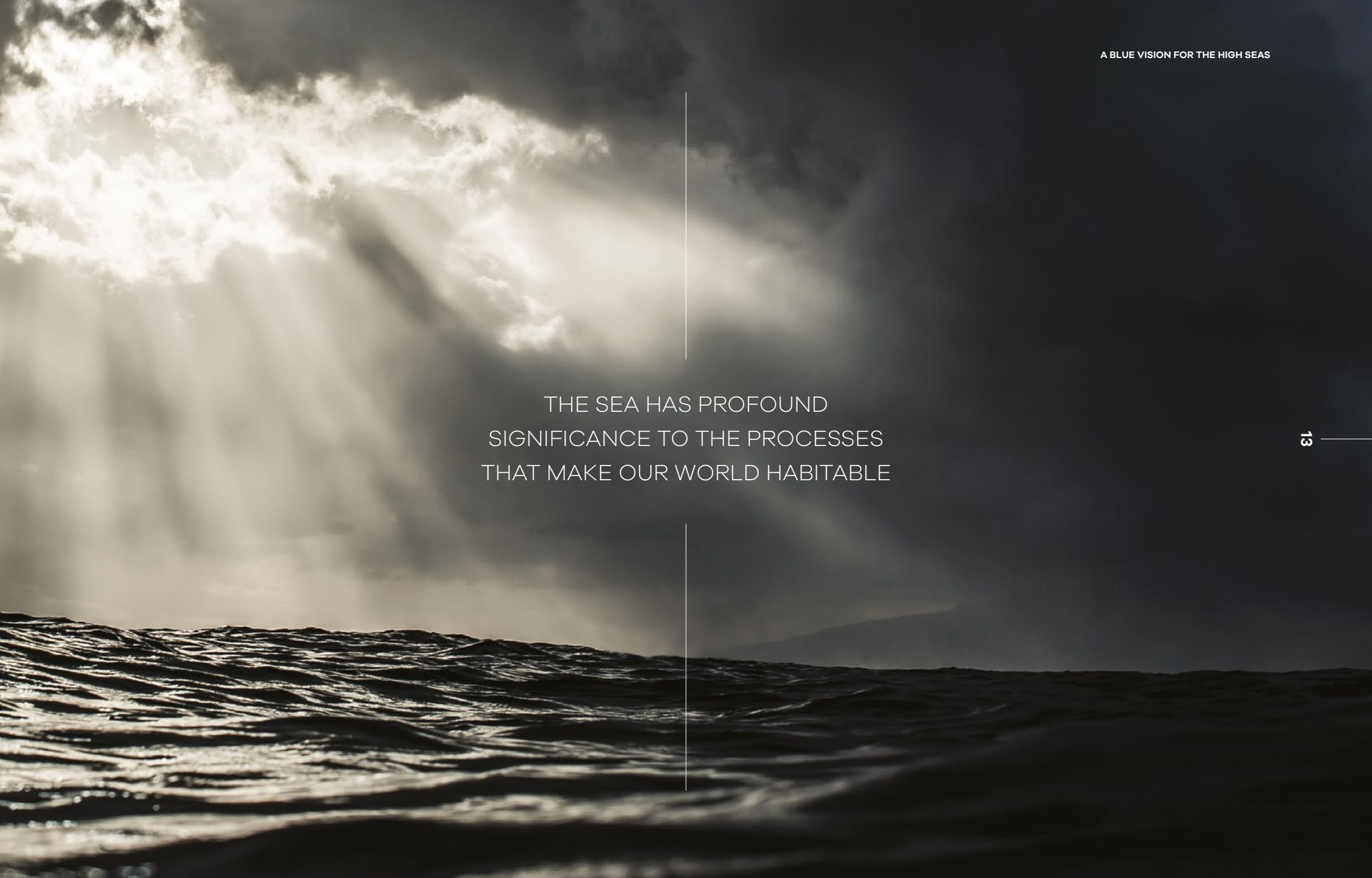
Callum Roberts
Trustee of BLUE Marine Foundation and Professor of Marine Conservation at the University of York, UK

THE HIGH SEAS

IT IS EASY TO FORGET, FROM OUR LAND-BOUND PERSPECTIVE, THAT THE EARTH IS AN OCEAN WORLD.

More than two thirds of its surface is blue, and each nation lays claim to a narrow sphere of influence extending beyond the horizon for up to 200 nautical miles from their shores (Figure 1). These national waters are known as Exclusive Economic Zones and, taken together, they occupy just 39% of the area of the sea. The rest is a vast global commons known as the high seas, an umbrella term that refers to marine areas beyond national jurisdiction (ABNJ). These international waters are made up of the High Seas (waters beyond Exclusive Economic Zones) and the Area (the seabed, ocean floor and subsoil beyond the limits of national jurisdiction). To complicate matters, many countries have also claimed Extended Continental Shelves which, where claims are successful, will extend the area of seabed and subsoil falling under national jurisdiction[1]. The waters overlying these Extended Continental Shelves will, however, remain High Seas.

Few people realise just how important the ocean is in human affairs. When the third dimension of depth is accounted for, the sea occupies a staggering 97% of the volume of living space on the planet[2]. What that means, put simply, is that life in the sea has profound significance to the processes that make our world habitable. Without a healthy, fully functioning life support system in the ocean, there would be no life on land. It is therefore a matter of deep concern that marine life is under increasing threat from a cocktail of human



THE SEA HAS PROFOUND
SIGNIFICANCE TO THE PROCESSES
THAT MAKE OUR WORLD HABITABLE

pressures, including fishing, chemical pollution, plastics, shipping, mining, climate change and acidification[3,4,5,6].

The politically defined zones that determine ownership and management of our oceans are of immense importance to countries as they determine national rights over living and non-living resources. However, they are of little consequence to marine life apart from the varying levels of protection they might receive from human activities in different parts of the sea. The high seas cover 43% of the Earth's surface, 61% of the surface area of the oceans and 70% of the volume of living space on Earth[7]. Previously, their remoteness placed the high seas beyond the reach of many human activities. However, with technological improvements, increased demand, and unsustainable management in coastal waters, fishing has intensified and expanded, shipping volumes have grown and new activities such as deep-sea mining are emerging.

The first great wave of human exploitation of the high seas came in the 18th century when whalers, following on the heels of explorers, began to undertake long voyages in search of fortune. By the beginning of the 19th century, whaling had become the first global industry, reaching almost every corner of the ocean (Figure 2)[8,9,10]. Whalers extended the limits of the known world as they pushed into the unknown in search of new grounds.

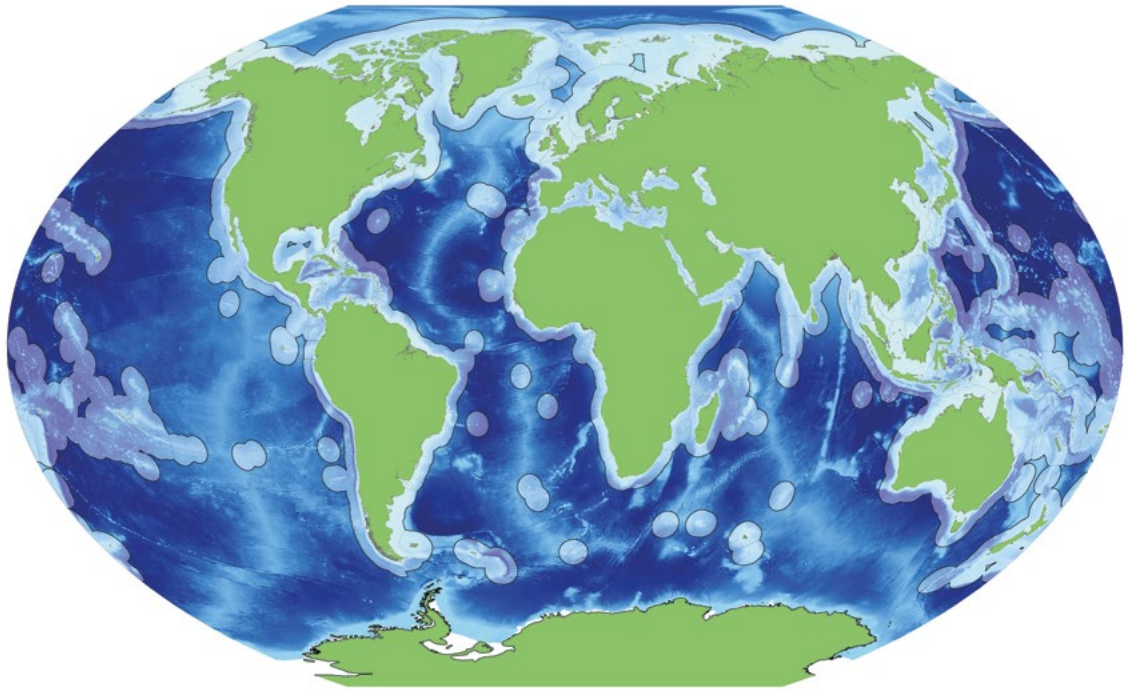


Figure 1: Map showing international waters, dark blue, and areas within the 200 nautical mile limits of national jurisdiction, light blue. 61% of the area of the oceans lies within international waters.

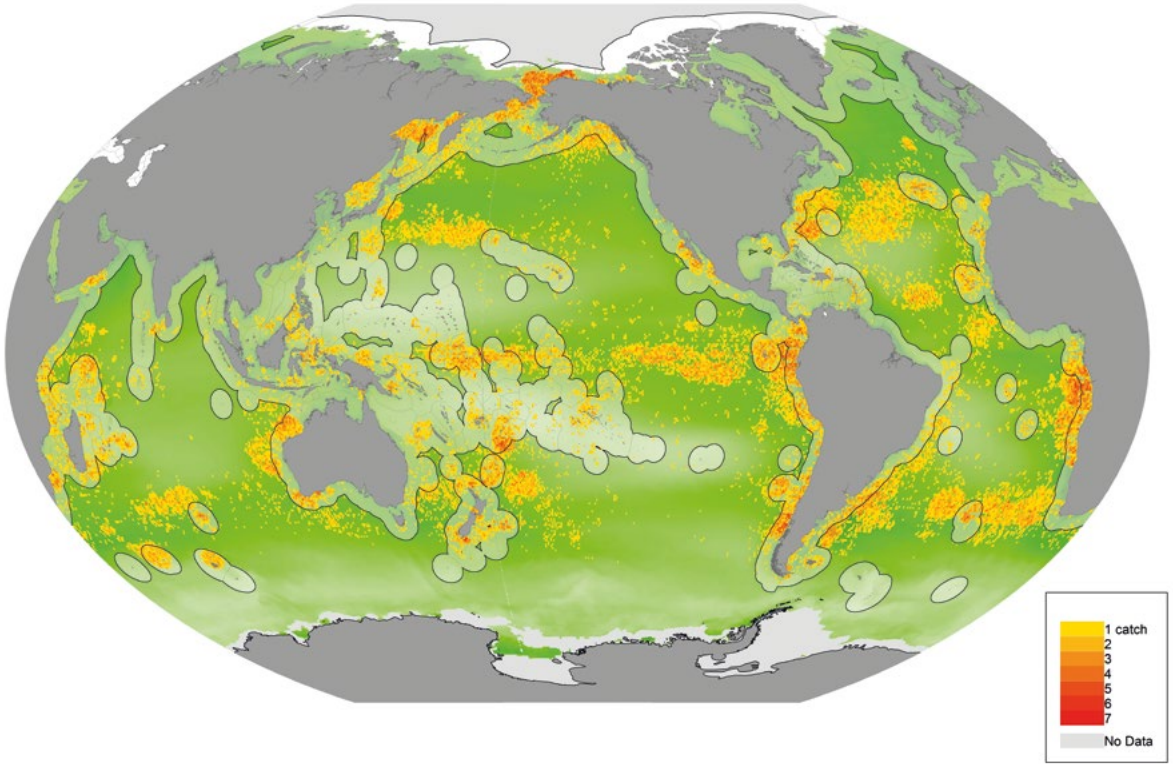


Figure 2: The locations of more than 53,000 sperm, southern right, northern right, humpback and bowhead whales caught by American whalers between 1761 and 1920, plotted by Charles Haskins Townsend, the Director of the New York Aquarium. The kills are plotted onto a map showing global ocean primary productivity. In many places, there is a close association between areas of high productivity and the presence of whales. Data digitised and supplied by the Wildlife Conservation Society of Canada (wcscanada.org).

With abundant fish close to coasts, fishers did not follow whalers into the high seas until the 1930s, when Japanese boats began to voyage into the north-west Pacific in pursuit of tuna. After the hiatus of World War II, other countries joined them and high seas fishing expanded rapidly, reaching across every ocean by the end of the 20th century and taking in a wider range of target species[11,12] (Figure 3). As well as tuna, high seas vessels today go after billfish, sharks, manta rays, krill, toothfish and a variety of deep sea species, catching them with longlines, purse seines, drift nets and trawls[13]. The methods of extraction are industrial in scale and use increasingly sophisticated technologies to find and concentrate fish for capture, such as satellite tracked fish aggregation devices which are today set by the hundreds of thousands.

There are new threats emerging to join existing problems. Shipping traffic is rising in step with global economic growth, creating underwater noise pollution and risking ship strikes of surface living animals like whales and whale sharks. Those same vessels move creatures from place to place, introducing alien species to new environments where they may become invasive. The deep ocean is on the cusp of being mined for rich mineral deposits[14]. The global aquaculture industry is exploring ways to capture deep-living fish to feed a fast-growing business hungry for fishmeal and oil. Plastic pollution has passed a tipping point as it fills up the sea, bursting into

the global consciousness and conscience in the last few years. Those plastics accumulate on the high seas in the slowly rotating centres of ocean gyres[15,16]. And casting a shroud over all of this, global warming and ocean acidification are beginning to take their toll[5].

For the last fifteen years, the world community has begun to acknowledge this growing marine ecological crisis, mandating the creation of national networks of marine protected areas (MPAs) and rebuilding fish stocks to maximum sustainable yield levels[17,18]. The response has been slow and patchy, with targets missed and postponed, and action on greenhouse gas emissions falling short of the scale and rate required to stabilise the climate[19]. But progress is being made, mostly within the limits of national sovereignty[20,21]. Beyond those limits, the high seas remain a frontier world where weak laws and poor governance allow overfishing and human rights abuses in pursuit of quick profits[22].

The high seas management challenge is compounded by the vulnerability of its life and ecosystems. The deep ocean is very easily damaged as life there has developed with little outside disturbance and is extremely slow growing and often very long-lived[23]. Seamount corals can live for over a thousand years, fish like orange roughy and sleeper sharks for hundreds. Reproductive rates are slow, and once inflicted, damage could take centuries or millennia to

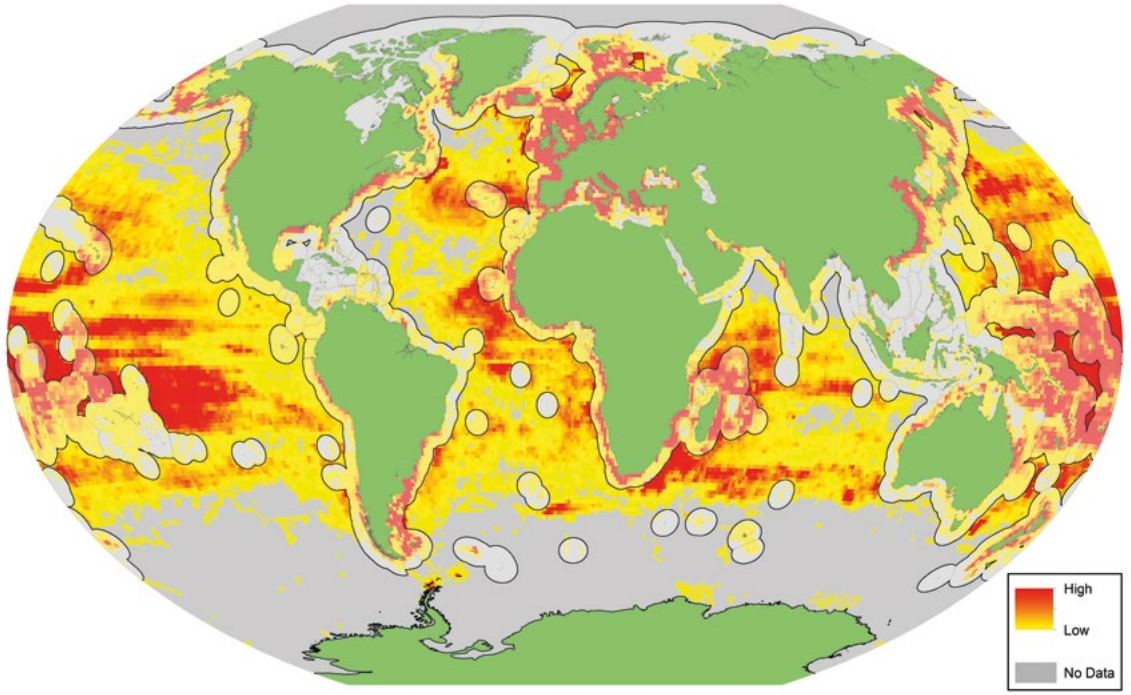


Figure 3: The global distribution of high seas fishing effort across the world oceans based on satellite position data from Automatic Identification Systems carried by vessels operating between 2015 and 2017. The data represent aggregate fishing effort by purse seine, longline and trawl boats from approximately 60% of the fishing fleet (Source: globalfishingwatch.org with processing by Kristina Boerder).

repair. The waters of the deep open sea sustain life that is mostly hidden, little known and often very dilute. At the surface, while some species have limited ambits, many are far-ranging, passing from international to national waters and back again, taking in multiple jurisdictions along the way[14]. There has been a catastrophic failure of governance and loss of marine life, threatening fisheries, livelihoods and the ecological integrity of a system that might reasonably be considered the beating heart of Earth.

It is in this context that the United Nations began a process in 2004 to consult on options for better protection of life in areas beyond national jurisdiction[24]. The consultations concluded in 2015 with a recommendation that the UN develop a legally binding Treaty for the effective conservation and management of high seas life. Elements of this Treaty are to include capacity building for management, environmental impact assessment for high seas activities, benefit sharing from marine genetic resources, and marine protected areas. In 2018 the UN convened an Intergovernmental Conference to draft the Treaty and negotiations are expected to take two years. The work of this conference is vital to reverse the decline of high seas life and ensure improved future ocean health.

Why are the high seas important?

From our above water perspective, the high seas appear as a featureless and empty blue plain wrapped around the planet. But the whalers of old discovered them to be varied and complex, with rich year-round and seasonal concentrations of life. Their locations are dictated by varying patterns of productivity, ocean currents and seasonal temperature variations (Figure 2). It is only in the last few decades that scientists have begun to understand the ecological basis for this centuries-old high seas lore. Satellite maps of sea surface plankton productivity show areas of upwelling nutrients that brought whales from far and wide to feast on these blooms or the life they supported. Satellite tagging of seabirds, seals, dolphins, sharks and a host of other megafauna reveal in exquisite detail their oceanic odysseys, picking out migration routes that criss-cross entire oceans[25,26], and highlighting places where they gather to feed or breed.

Beneath the sunlit surface layer there is a twilight world that scientists call the 'mesopelagic' which spans a range of 200 to 1000m deep[27]. At the upper edge of this realm the light is too dim to support plant growth; at the lower edge it fades to complete darkness. The creatures that live here must therefore feed upon a falling snow of sinking organic matter, swim toward the surface to feed in more productive waters, or hunt other creatures that do so. This deep world of open water between the surface and seabed is one of the least explored spaces on the planet: ninety-five percent of it has never been visited or studied. It is only in the last couple of decades we have discovered quite how rich it is.

Oceanographers have long recognised a phenomenon called the 'deep scattering layer' on their echo sounder traces[28]. Sometimes this was so dense it was mistaken for the bottom. Mostly, however, it is a ghostly shimmering layer indicative of a concentration of matter in the water. That this layer is alive was made clear by its movement up and down in the water over the course of a day, rising toward the surface at night and retreating to the depths before sunrise[29]. Tens of billions of planktonic organisms, fish and squid move up and down in synchrony, together undertaking the biggest migration on Earth. Recent estimates suggest that this layer might hold as much as ten billion tonnes of fish, nine times greater than the combined weight of all the surface living fish[30,31]. Mostly they are tiny creatures little bigger than a finger, like lanternfish and hatchet fish whose bodies glow with rows of tiny lights. Mesopelagic species play a crucial role in what is known as the 'biological carbon pump' facilitated by their daily vertical migrations. These fish feed near the surface and then retreat to deep water where they defaecate, thereby helping to transfer organic[32] and inorganic[33] carbon from the surface to the deep sea. It has been estimated that without this role, atmospheric levels of carbon dioxide would by 50% higher and the world would be much hotter[34].

Seabed features are being resolved in ever greater detail by satellite altimetry and multibeam sonar[35]. Mountain ranges longer than any on land divide ocean basins and deep trenches that could swallow Pyrenean mountains cut the seafloor where tectonic plates slide underneath others. Seamounts extend in chains from volcanic hotspots, sometimes for thousands of kilometres. They are used by nomadic species in the sea to guide their migrations and as stopovers for refuelling on the rich life that concentrates around their slopes and peaks[36]. Within oceanic basins, the muddy abyssal plains represent one of the largest habitats on Earth and the flattest. Across

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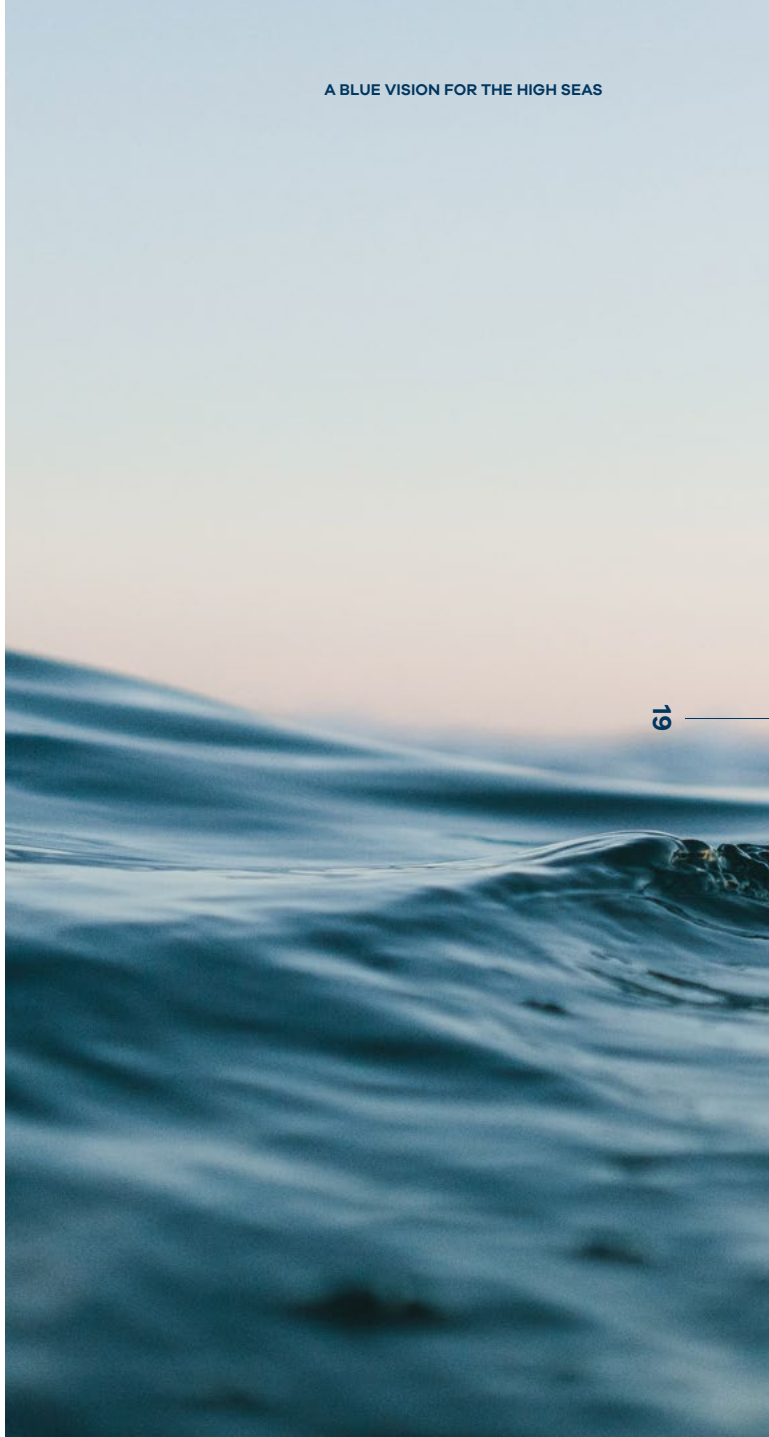
millions of square kilometres, these are places where changes happen on the creeping scales of millennia. Sediment accumulates at rates of millimetres per thousand years, currents are slight and intense cold, pressure and darkness make this a world totally unlike any we have experienced.

At the boundaries between tectonic plates, fields of hot springs belch mineral-rich superheated water into the icy bottom water, fuelling chemosynthetic food webs. They produce spectacular concentrations of life including clams as tall as people and yeti crabs with hair covered carapaces that swarm around water plumes that could cook them in a second if they stray too close. The sphere of influence of these springs extends beyond their spatial footprint, reaching up into the water column and enhancing productivity more widely[37].

In contrast to the wandering megafauna that live near the surface of the open sea, deep water animals often have very small geographic ranges. It is hard to estimate how many of these endemic creatures there are when we have sampled so little of the deep sea. Species may appear to have very limited distributions because we have only sampled a small fraction of their ranges. However, particular habitats that are isolated from one another by long stretches of space are rich in apparent endemics, including seamounts, hydrothermal vents and trenches, for example. A quarter of the species inhabiting closely spaced seamount ranges, or vent fields, may be unique



to them. This great richness is also a source of vulnerability, since localised impacts could cause global loss of species.

Despite the recent revolution in our understanding of the high seas and deep ocean, what we know is eclipsed by what we don't. Countless discoveries are yet to be made and mysteries uncovered. Even with centuries more scientific effort and exploration this vast marine space will still have its secrets. What is not in any doubt, however, is that the creatures of the high seas and deep sea are in trouble. Animals as diverse as sharks, albatross, whales and turtles have seen precipitous declines in numbers over alarmingly brief timescales. Ninety-seven percent of Pacific leatherback turtles have been killed by fishing nets, longlines or poaching[38,39]. Ninety-seven percent of Pacific bluefin tuna have been fished out under the watch of those charged with their management, yet still fishing continues[40]. Several species of albatross teeter on the brink of extinction, the collateral damage of vessels that fish in their foraging spaces, the losses entirely avoidable. Seamounts across four oceans have been scraped bare of their corals, sponges and other invertebrates, yet a dozen years after the UN General Assembly called for their protection (UNGA Resolution 61/105), the destruction goes on.

Healthy, sustainable fish stocks in international waters are vital to the productivity of fisheries in national waters since most of the species

Our present failure to adequately protect life in international waters will have planetary repercussions.

that inhabit the high seas also straddle national waters. As well as supporting fisheries, high seas life provides a host of ecological services. They include a nutrient pump from deep to surface waters facilitated by creatures like whales, sharks and tuna that dive deep to feed and defaecate at the surface. They promote the growth of phytoplankton which produce oxygen and food for a host of other life and sustain fisheries. As noted earlier, creatures of the twilight zone facilitate the transfer of carbon from the surface to the deep ocean via their vertical migrations, taking it away from the atmosphere and thereby mitigating some of the effects of greenhouse gas emissions. The diversity of life at sea breaks down and neutralises wastes in runoff from the land. Given the huge space over which these processes operate, making up 70% of the volume of the biosphere, together they are crucial to the wellbeing of all life on Earth, including ourselves. Our present failure to adequately protect life in international waters, if not urgently addressed, will have planetary repercussions.

Current high seas management

International waters are managed under the United Nations Convention on the Law of the Sea, UNCLOS, which was drafted during the 1970s and early 80s, and finally came into effect in 1994. It has now been ratified by 157 signatory nations and bodies. The Convention formalises freedoms, established over centuries, and allies them with certain duties (Box 1). Signatories are responsible for ensuring compliance with these duties by their own citizens and ships flying their flags.

Management oversight of the high seas and its exploitation and use is vested in regional bodies, including Regional Fisheries Management Organisations (RFMOs) and Regional Seas Programs/Treaties, such as OSPAR in the North East Atlantic and the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR) in the Southern Ocean. Parties to these RFMOs and Conventions make decisions on the exploitation and protection of marine resources within the regions covered.

Global organisations work alongside these regional bodies. The International Seabed Authority has responsibility for management of seabed mineral resources in the Area while the International Maritime Organisation is responsible for shipping.

It is thirty-seven years since the UN Convention on the Law of the Sea was completed, and twenty-five years since it came into force. The current negotiations at the United Nations for a Treaty to protect biodiversity beyond national jurisdiction therefore represent a rare and fleeting opportunity in the history of ocean management. It is crucial that we seize it now and that the legally binding instrument for biodiversity protection that results is well crafted to meet the scale and urgency of the challenge. To be effective, it will need to strengthen and complement the existing legal and management regime for the high seas and reframe it around precautionary ecosystem protection. It will need to promote coordinated and cooperative action by the bodies responsible for management, and must ensure transparency of process and accountability of actions by these bodies.

FREEDOMS AND DUTIES UNDER THE UN CONVENTION ON THE LAW OF THE SEA

FREEDOMS TO:

- Fish
- Navigate
- Lay submarine cables and pipelines
- Conduct scientific research
- Construct artificial islands
- Authorise vessels to fly national flag

DUTIES TO:

- Conserve marine living resources
- Protect and preserve the marine environment, including rare or fragile ecosystems and habitat
- Cooperate
- Control flag vessels and citizens
- Comply with other international legal obligations

BLUE's Vision for the High Seas

BLUE's vision for the high seas in 2030, is one of a world transformed. The social, economic and ecological benefits and wealth of the high seas are equitably shared among all countries and generations. Strong and effective cross-sectoral institutions govern high seas activities and recognise the global value of healthy open ocean ecosystems for the functioning of the Earth system. They embed the precautionary principle in all management, make decisions following best-available scientific knowledge and take an ecosystem-led approach that acknowledges the critical importance of nature to human wellbeing.

Regional Fisheries Management Bodies have been reformed, changing their mandate from pure exploitation to an approach that only allows exploitation compatible with environmental protection. They set science-based rules with which all countries fishing their regions must comply, and have embraced the use of spatial fishing closures and marine protected areas to achieve sustainable, low impact fishing. Recovery of historically overexploited species is underway and deep sea habitats are protected from further damage.

A network of Marine Protected Areas has been built by a new UN body emerging from the Intergovernmental Conference on Biodiversity Beyond National Jurisdiction which concluded in 2020. The network represents and gives full protection from exploitation to at least 30% of the area of all the habitats of the high seas. It forms a protective net which meets the needs of both sedentary and wide-ranging species and accommodates range shifts and ecosystem reconfiguration as the climate warms. The network promotes natural processes that help mitigate the adverse effects of climate change and boost the adaptive capacity of ocean life, helping high seas ecosystems to cope while the world brings down greenhouse gas emissions.

There has been a commercial moratorium on deep-sea mining and fishing of the twilight zone while research is done to determine their potential impacts and whether they can be sufficiently controlled. Research on these two nascent industries has been a central plank of the United Nations Decade of Ocean Science for Sustainable Development which ran from 2021 to 2030. The International Maritime Organisation is well advanced in its efforts to limit the environmental impacts of shipping, even as trade volumes rise.

This world is possible and within our grasp. But it will not happen without collective effort, vision and commitment to change by those involved with negotiations at the UN Intergovernmental Conference on Biodiversity Conservation Beyond National Jurisdiction. We have a once-in-a-generation chance to change the course of management of the high seas. We can replace greed, neglect and the pursuit of individual interests with multilateral cooperation and trust to achieve sustainable exploitation and environmental protection. It is a chance for the world to prove that it can act together for the greater good.

The urgency and importance of the present opportunity cannot be overstated. If we fail to produce a strong outcome from the UN negotiations now, we condemn the high seas to decades more decline, the irreversible loss of large expanses of vulnerable ecosystems and the extinction of iconic wildlife. Such losses will go far beyond economic hardship and aesthetic misery, risking the vital ecological processes that keep our planet habitable.

BLUE'S STRATEGY FOR THE HIGH SEAS: KEY ACTIONS

Fishing

Regional Fisheries Management Organisations (Figure 4) have been heavily criticised over many years for their failure to ensure the sustainable management of fish stocks and minimise the negative impacts of fishing activities to non-target wildlife and habitats[41,42,43]. The problems are many. Only signatory nations are bound by the rules set. Data collection is limited principally to target species and is often insufficient to support robust decisions. Decisions are often weak because most RFMOs and regional bodies make decisions by consensus and countries can veto or opt out of decisions that they don't like. The outcomes are therefore rarely precautionary and instead permit the take of fish at intensities that often cause overfishing[44]. There is generally inadequate surveillance, monitoring and enforcement, and uneven implementation of rules by different nations. This collective failure has precipitated the present crisis in high seas fisheries management, contributing to the current intergovernmental effort to afford greater protection to biodiversity.

High seas fisheries attracted unwelcome attention in the 1970s and 80s as giant drift nets, sometimes tens of kilometres in length caught and drowned thousands of marine mammals,

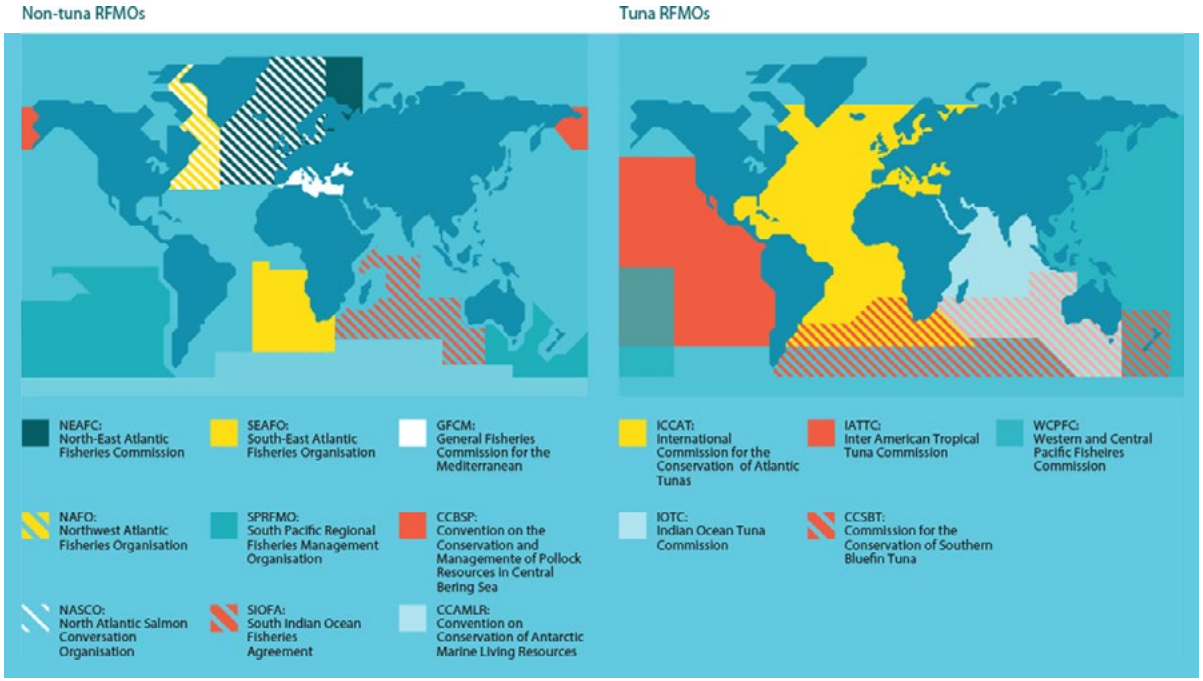
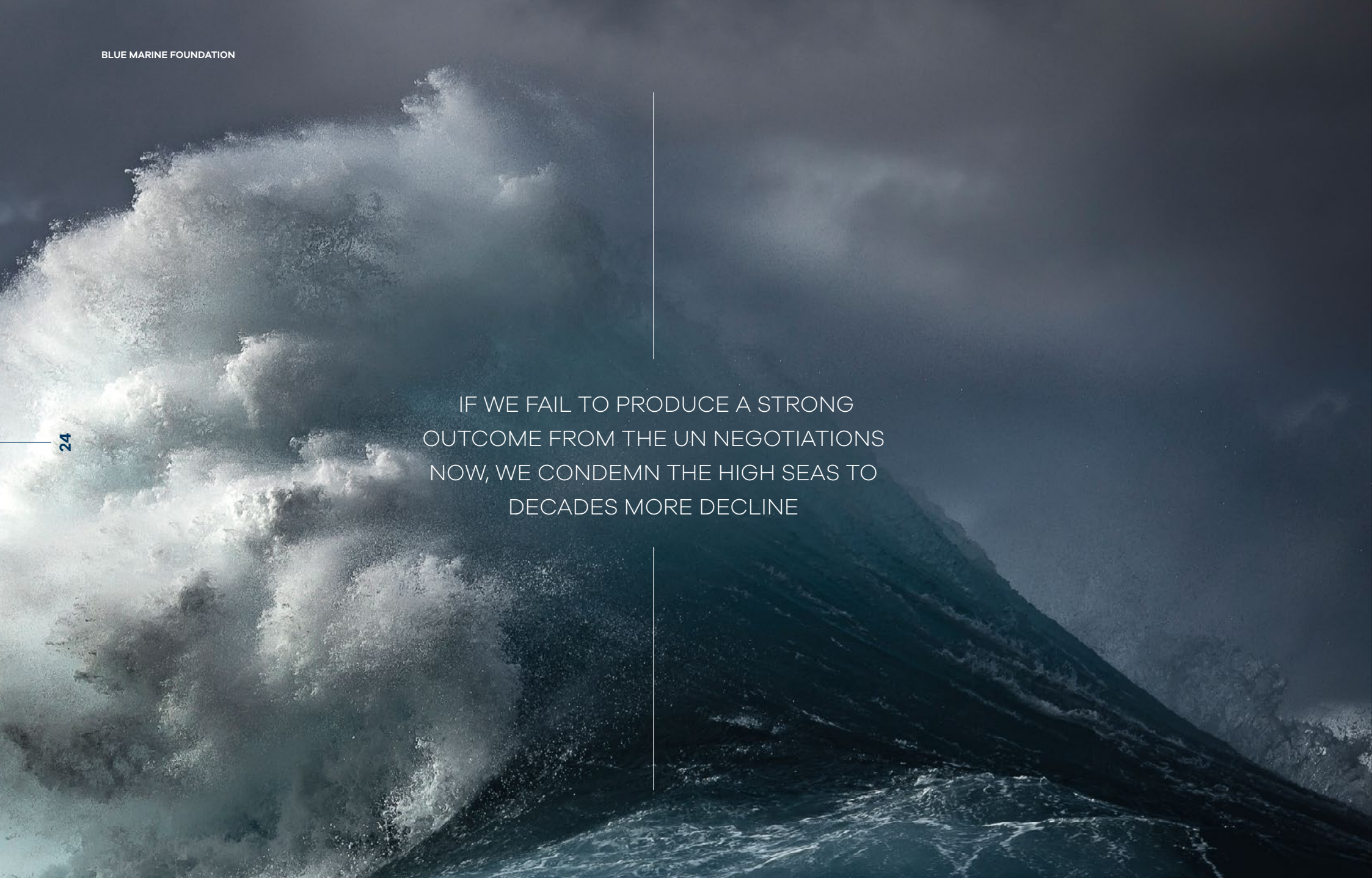


Figure 4: Areas covered by tuna and non-tuna Regional Fisheries Management Organisations. Only non-tuna organisations have any jurisdiction over fisheries of the deep sea. (Source: whofishesfar.org).

We can replace greed, neglect and the pursuit of individual interests with multilateral cooperation and trust to achieve sustainable exploitation and environmental protection.



IF WE FAIL TO PRODUCE A STRONG OUTCOME FROM THE UN NEGOTIATIONS NOW, WE CONDEMN THE HIGH SEAS TO DECADES MORE DECLINE

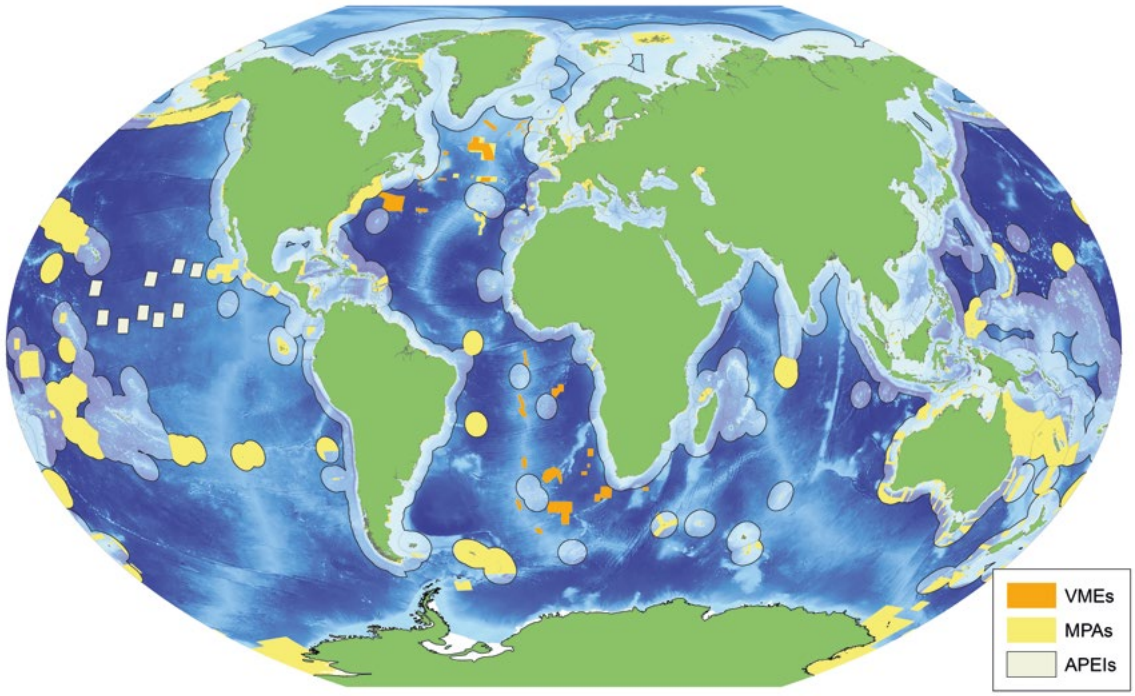


Figure 5: Area-based management tools in place on the high seas to safeguard marine wildlife. Marine protected areas (MPAs) have been established in the North Atlantic by OSPAR and in the Southern Ocean by CCAMLR. Vulnerable Marine Ecosystems on the deep seabed have been identified and protected by a few regional bodies only. Areas of Particular Environmental Interest (APEIs) have been established as no-mining zones in the Pacific Ocean by the International Seabed Authority. Collectively, these designations protect 2.6% of international waters. The figure also shows MPAs in national waters.

seabirds and turtles as well as fish, leading them to be dubbed 'walls of death'. The UN banned this fishing method in international waters in 1992 in what, in retrospect, was a rare act of unanimity to safeguard vulnerable marine wildlife (UN Resolution A/RES/46/215)[45].

Despite similar evidence of extreme damage to fragile habitats in the deep sea by bottom trawling[30], the UN General Assembly in 2006 rejected calls for a moratorium, instead directing management bodies to identify and protect areas of fragile seabed habitat in their regions (UN Resolution 61/105). More than a decade later, only a handful of Regional Fisheries Management Organisations has done so[46], establishing closures covering 1.9 million km^2, equating to only 0.86% of the area of the high seas (Figure 5). Some of these closed areas are demonstrably misplaced and fail to protect the habitats they are intended to. As concerning as the lack of progress and accountability, is that across a vast extent of the high seas, there are no management bodies with the mandate to protect the exceptionally fragile environment of the deep sea (see Figure 3, non-tuna RFMOs).

Recent analyses show further structural problems with high seas fishing. Landings contribute only 4.2% of global wild fish landings, 72% of them are taken by just ten, mostly well-off countries[47]. More than half of this fishing would not be profitable without public subsidies[48]. High

seas fisheries are therefore highly iniquitous, with the unsustainable take of fish benefiting a few nations at the expense of the rest[49]. This approach to fishing is highly irresponsible and risks serious long-term damage to the functioning of the global oceans.

Such damage could be multiplied by future developments. As noted above, there is increasing interest in the prospect of exploiting mesopelagic fish that live in the twilight zone, 200 to 1000m down. Many countries, including those of the EU and Norway[50] are actively fostering research and innovation to enable such fishing. However, much more research is needed on the biology and ecological role of mesopelagic species, and their vulnerability to overexploitation. If fishing goes ahead without such knowledge, it could have widespread implications for the structure and function of ocean ecosystems and their role in planetary processes.

The Commission for the Conservation of Antarctic Marine Living Resources is a notable exception in high seas management, having an ecosystem centric management mandate. It provides a partial model for how other RFMOs might be reformed to improve their performance and increase protection to wildlife. Article II of CCAMLR states:

1. The objective of this Convention is the conservation of Antarctic marine living resources.
2. For the purposes of this Convention, the term 'conservation' includes rational use.
3. Any harvesting and associated activities in the area to which this Convention applies shall be conducted in accordance with the provisions of this Convention and with the following principles of conservation: **(a)** prevention of decrease in the size of any harvested population to levels below those which ensure its stable recruitment. For this purpose its size should not be allowed to fall below a level close to that which ensures the greatest net annual increment; **(b)** maintenance of the ecological relationships between harvested, dependent and related populations of Antarctic marine living resources and the restoration of depleted populations to the levels defined in sub-paragraph (a) above; and **(c)** prevention of changes or minimisation of the risk of changes in the marine ecosystem which are not potentially reversible over two or three decades, taking into account the state of available knowledge of the direct and indirect impact of harvesting, the effect of the introduction of alien species, the effects of associated activities on the marine ecosystem and of the effects of environmental changes, with the aim of making possible the sustained conservation of Antarctic marine living resources.

Poor management will cause continued decline of target species and the possible extinction of the most threatened high seas species.

Given this broad remit, it is not surprising that CCAMLR has had greater success in controlling fishing intensities and damage. No bottom trawling is allowed within the CCAMLR region, for example, and the Commission has been very successful in dealing with illegal longline fishing for toothfish. It therefore offers an example of what might be possible for other RFMOs given the necessary reforms. BLUE therefore:

Calls for urgent reform of RFMOs:
Regional Fisheries Management Organisations are not fit for purpose. While some of the more recently constituted ones have made improvements[41], across the majority of the high seas the governance regime is flawed and ineffective and there are considerable gaps in geographical coverage. These flaws have been apparent for many years and have not been dealt with by the UN or the RFMOs themselves. There

To become effective, RFMOs will need to be reconstituted around the following principles:

1. Their mandate needs to be revised to ensure that fishing will only be permitted if it does not compromise ecosystem integrity or endanger wildlife, similar to the mandate under which CCAMLR operates.
2. Membership of the RFMO should be mandatory for all nations fishing within the waters covered.
3. Conservation interests should have equal stakeholder representation in decision-making to those representing fishing interests.
4. Decisions of the RFMO should be binding on all parties: no opt outs, no vetoes.
5. Decisions should be made by majority, not consensus, and decision making should be transparent.
6. Parties should be required to follow scientific advice in decisions; this is a stronger standard than simply having to 'take note' of science, as is widespread current practice.
7. RFMOs should support MPA establishment for wildlife conservation, and should use MPAs and other area-based conservation measures as part of a package of fisheries management tools.
8. RFMOs should be required to actively and effectively cooperate with other RFMOs, Regional Seas Bodies and other sectoral institutions such as the International Maritime Organisation and the International Seabed Authority to facilitate comprehensive management across all human activities.

is an urgent need for an overhaul of the present management bodies

Calls for a moratorium on high seas fishing:
Required reforms to RFMOs will take years to implement. In the meantime, poor management will cause continued decline of target species, ongoing and potentially irreversible habitat damage, and the possible extinction of the most threatened high seas species. The narrow distribution of high seas fishing benefits to a handful of countries[34,51] means that a few are responsible for the majority of environmental damages to a global resource, and therefore argues for a pause on high seas fishing to redress the balance of equity. This view is supported by economics, with so few fish caught on the high seas by fisheries that are mainly unprofitable without public subsidies[8,34], it makes sense not to fish there at all. A moratorium on fishing the high seas is fully justified while RFMOs are reformed.

Calls for a moratorium on developing fisheries for mesopelagic fish:
Mesopelagic fish are not yet exploited, but with countries investing heavily in research exploitation will soon begin. We know little about the mesopelagic realm. It is one of the least studied places on the planet. However, we know enough to know that mesopelagic fish may play a hugely important role in the planetary carbon

Figure 6: Satellite tracks of ships (> 300 gross tonnes) carrying Automatic Identification Devices. There is no land shown on this map. The outlines of the continents and rivers are drawn by vessel traffic. (Source: Kristina Boerder).

cycle and in mitigating the effects of greenhouse gas emissions[52]. Mistakes made in this deep sea world could have global impacts, unleashing adverse consequences that may endure for centuries. There is an urgent need for the risks to be recognised and a precautionary approach taken. A moratorium on mesopelagic fishing is a very sensible first step while science catches up with the fishing companies. This moratorium should be timed to coincide with the forthcoming UN Decade of Ocean Science for Sustainable Development, which runs from 2021-2030, and which should facilitate and promote science in the mesopelagic zone.

Shipping

Shipping routes criss-cross the world oceans[53]. Satellite monitoring of Automatic Identification System (AIS) pings reveals great ocean highways, roads less travelled and rarely visited backwaters (Figure 6). As shipping volumes have grown, so too has recognition of the threats they pose to wildlife, particularly from vessel strikes[54], underwater noise[55] and greenhouse gas emissions[56]. Freedom of navigation is enshrined by UNCLOS (Box 1) and management that is disruptive of navigation is likely to be vigorously resisted. But other kinds of management can reduce impacts.

There are actions the International Maritime Organisation should take to reduce shipping impacts. The noisiest 15% of the world fleet produces around half of the underwater noise . Retiring these ships would be highly beneficial as many species rely on sound to sense their environment underwater and to communicate over distances of hundreds or thousands of kilometres[54]. Research into quieter shipping technology should also be intensified, particularly if allied to methods that will increase fuel efficiency and reduce emissions. Noise pollution and the risk of vessel strikes can be reduced[55,56], and fuel efficiency increased[57] if ships travel more slowly. Speed restrictions, especially in areas where vulnerable wildlife concentrate, should therefore be pursued, potentially implemented through the designation of Particularly Sensitive Sea Areas for the high seas.

BLUE therefore calls for efforts to reduce vessel noise, increase fuel efficiency and reduce emissions, and research to identify areas where wildlife is particularly at risk from shipping and would benefit from mitigation measures.

Deep sea mining

Mining of seabed mineral deposits is still not economically viable and therefore remains in the exploration phase where it has been since the 1960s. There has, however, been a rapid acceleration of interest and investment in deep-sea mining[24]. There are major problems of such mining from an environmental standpoint. The most serious is that valuable mineral deposits are concentrated around areas of high biodiversity and the habitats involved are extremely sensitive to damage[62,63]. Polymetallic nodules (also known as manganese nodules) are typically found on the abyssal plain[24]. Nodules range from grape to fist sized and grow by chemical precipitation of minerals at a rate of around 10mm per million years. The environment in which they occur experiences very little disturbance and rates of sedimentation are of the order of millimetres per thousand years. Nodules represent the only hard substrate in thousands of square kilometres of fine sedimentary oozes. They are critical attachment points for a variety of invertebrates that cannot live directly in mud[64].

Mineral rich crusts also form by chemical precipitation around hydrothermal vents where they support very high densities of marine life on actively venting hot springs[24]. They also occur, to a lesser degree, in crusts tens of centimetres thick that form on seamounts and deep ocean ridges. The latter habitats are characterised by the presence of seafans, corals and sponges that may be hundreds or even more than a thousand years old. Any mining will have serious impacts on the places from which minerals are extracted[24,65,66]. It could cause global extinction of narrowly distributed, highly endemic species like those known to occur on seamounts and hydrothermal vents[67]. However, the impacts are likely to spread far more widely than the footprint

of mineral extraction through the spread on ocean currents of plumes of sediment from tailings. Most deep sea deposits are thinly spread, so to extract the same quantity of ore, over 100 times greater area will need to me mined in the sea compared to on land[68]. This sediment will be contaminated with potentially toxic by-products of mining that can be taken up into oceanic food webs. From there it could bio-magnify up the food web, accumulating in the bodies of top predators like sharks and tuna, many of which are important to fisheries.

The International Seabed Authority is responsible for oversight of mining in international waters. At present, it is acting as both promoter of mining – licensing areas for exploration – and as regulator – developing a mining code to govern the extraction of minerals[69]. It anticipates that the mining code will be ready by 2020, which looks rushed considering how much more we have to learn about the deep ocean. The dual role also appears to be a conflict of interest; it is hard to see how both roles can be performed effectively by the same body.

The ISA has licensed much of the Clarion-Clipperton Fracture Zone area of the Eastern Pacific for polymetallic nodule exploration (Figure 7). After criticism about their lack of measures to protect the environment, nine Areas of Particular Environmental Interest were identified and 'tacked on' to existing mining claims[70] (Figure 5). These areas are meant to be representative of the

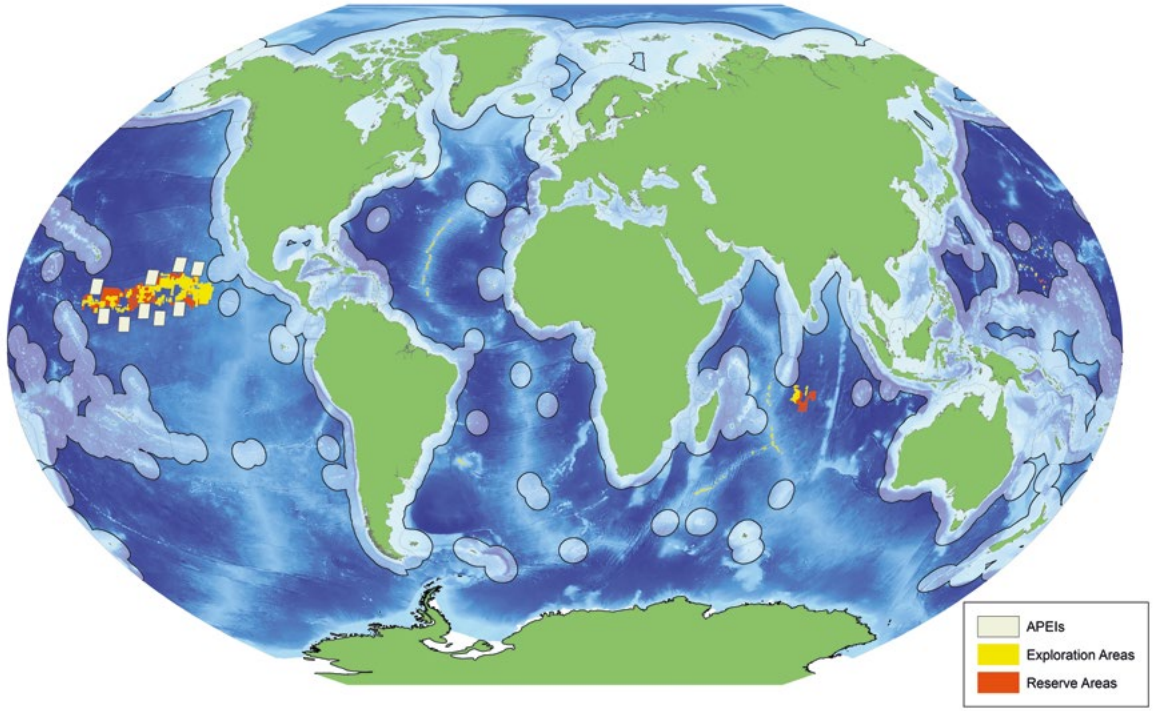


Figure 7: Areas licensed for deep sea mineral exploration by the International Seabed Authority. APEIs are Areas of Particular Environmental Interest set aside to mitigate the adverse effects of mining impacts.

biodiversity of the region, but there are doubts among scientists about how well they achieve this, or whether they will remain isolated from the impacts of any commercial extraction from nearby mining claims.

Areas of mid-ocean ridge and seamount have also been licensed for exploration in the Atlantic and Indian Oceans (Figure 7) but no comparable Areas of Particular Environmental Interest have been designated in these oceans. Furthermore, the ISA has attracted much criticism from environmental organisations for licensing exploration an area of high environmental interest in the Atlantic, a hydrothermal vent structure known as 'The Lost City'. The ISA has also failed to take any action to restrict or prohibit mining within the six high seas MPAs established by OSPAR in the North Atlantic.

Given the serious potential impacts from deep sea mining, their likely extreme longevity and broad geographical spread, extreme caution is warranted in developing this industry. Given how little we know about the habitats and species that mining would affect, the poor scientific understanding of the likely impacts of mining and of how to minimise or mitigate them, there is a clear case for a pause.

BLUE therefore calls for a ten-year moratorium on any commercial deep-sea mining, timed to coincide with the UN Decade of Ocean Science for Sustainable Development. During this moratorium,

no further areas should be licensed for exploration. The moratorium will allow necessary science to be done to assess mining impacts and options for their management. It would also allow time for scrutiny of conflicts of interest in the International Seabed Authority, for the drafting of more robust exploitation guidelines and regulations, and for a global MPA network for the high seas to be developed unconstrained by any further mining claims.

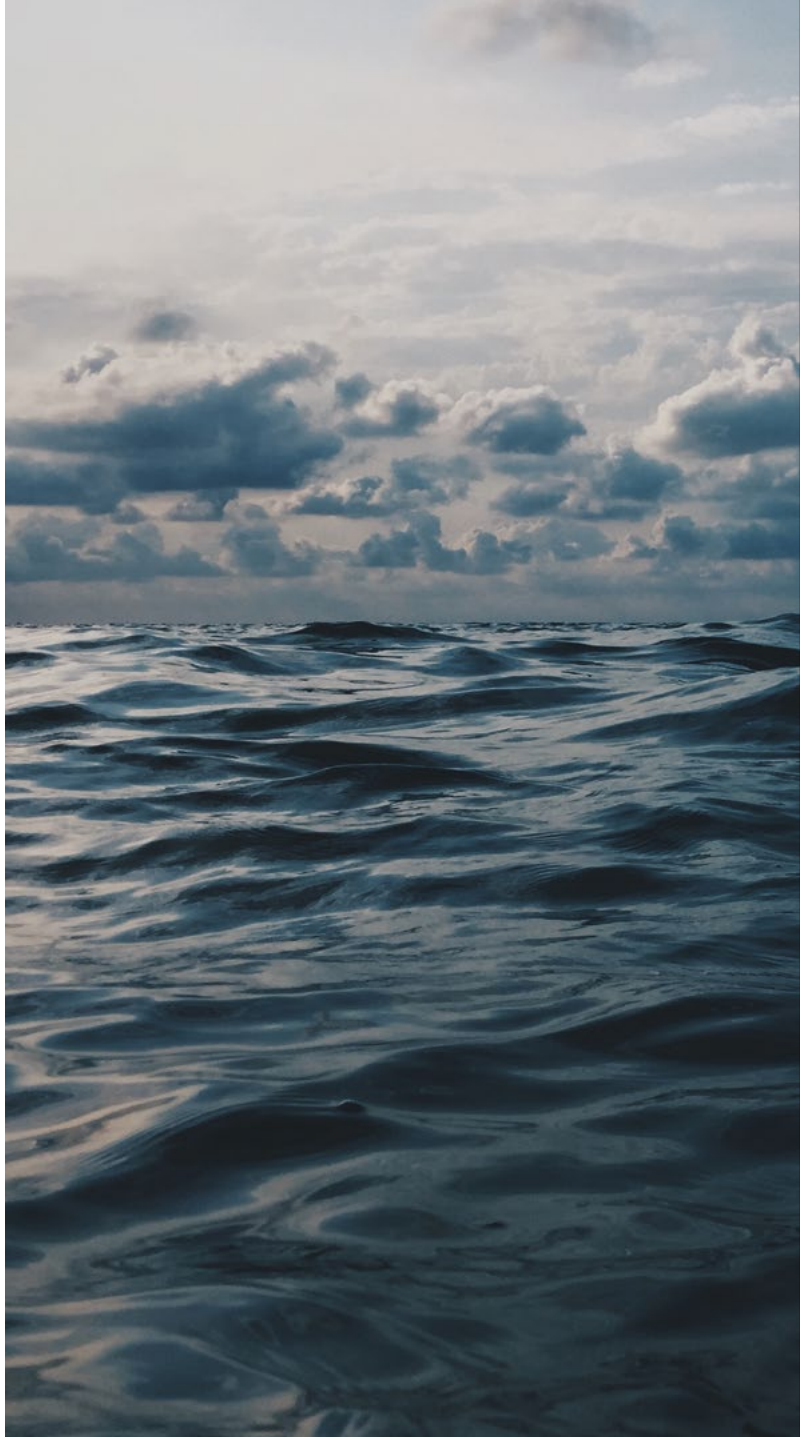
Biodiversity conservation through marine protected areas

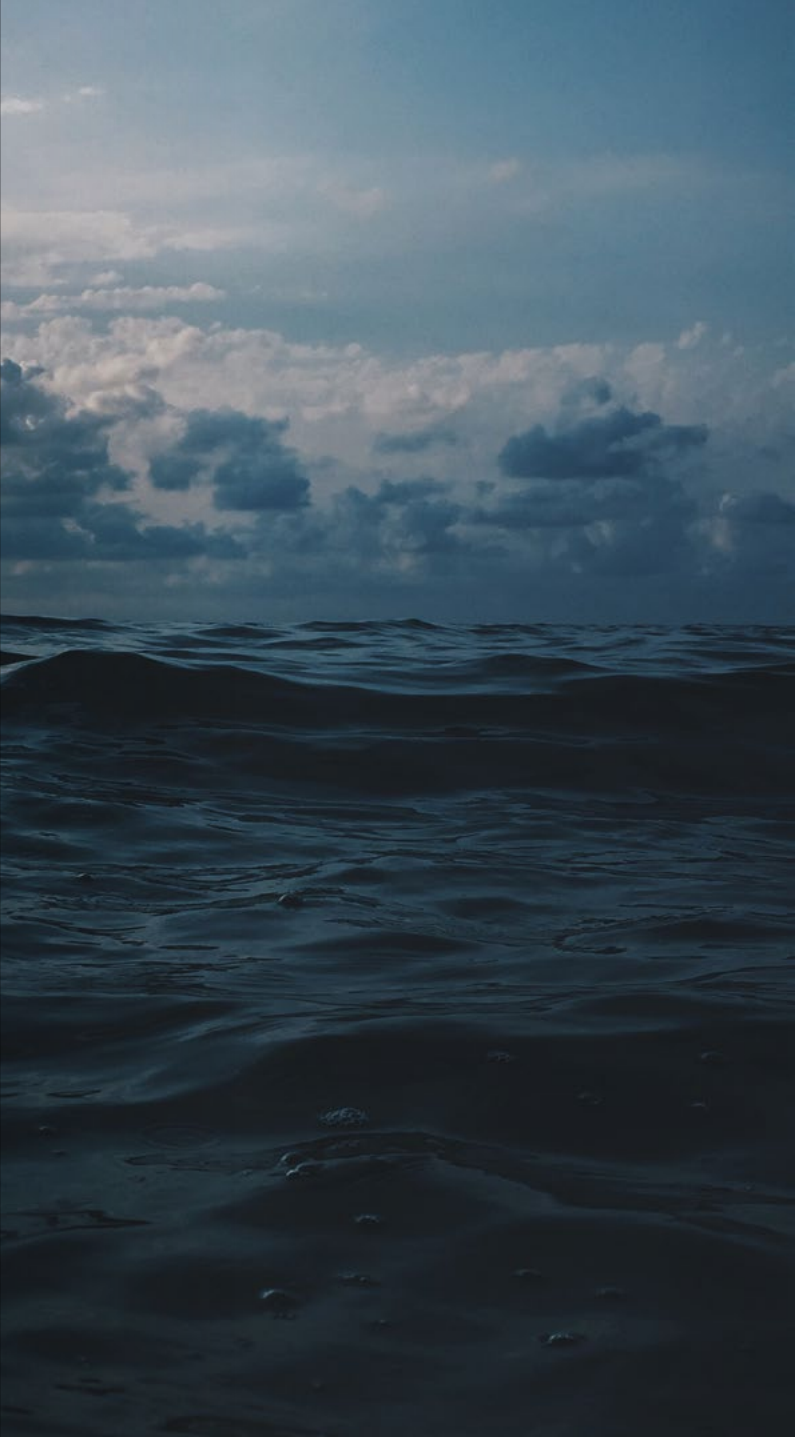
Article 8a. of the Convention on Biological Diversity directs signatories to "Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity." While the Convention also says that signatories have "responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction," there is no mechanism to create protected areas beyond national jurisdiction. This omission leaves 43% of the surface of the planet and 70% of the volume of the biosphere with inadequate protection.

Noting the legal lacuna, two regional seas bodies have gone it alone with respect to MPA establishment: OSPAR and CCAMLR. OSPAR established six North Atlantic high seas MPAs in 2010 and a further one in 2012, while CCAMLR has established two in the Southern Ocean, one in 2009 and the second in 2016. Together, these nine MPAs cover 1.2% of the high seas.

These protected areas have been added to by RFMOs that have identified and protected Vulnerable Marine Ecosystems, and the International Seabed Authority's Pacific Areas of Particular Environmental Interest, which are 'no-mining' zones. Collectively, they protect just 2.6% of the area of the high seas (Figure 5)[71].

Despite the absence of an agreed mechanism to create MPAs across the whole extent of the high seas, areas beyond national jurisdiction are implicitly included in the marine protected area target of the UN Sustainable Development Goal 14, which states that "By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on best available scientific information." If the high seas are not part of this protected network, nations will have to protect more than a quarter of the areas within their Exclusive Economic Zones to meet the 10% protection target at the scale of the whole ocean[72]. Even if we were to be successful in reaching this goal, the MPA networks would not be fully representative of ocean habitats, thereby failing to meet the 'ecologically representative' criterion of Aichi Target 11 of the Convention on Biological Diversity. Furthermore, an expanded network of high seas MPAs will be essential to meet the higher protection target of at least 30% by





2030 currently gaining support as a post-2020 target for the Convention on Biological Diversity[73].

The Intergovernmental Conference on Biodiversity Beyond National Jurisdiction is widely expected to create a legal mechanism to establish MPAs. To be effective, that legal mechanism should allow protection of the whole water column and seabed, together with mobile species of fauna and flora, including commercially important fish[74,75]. In this arena, a BLUE therefore will:

Campaign to ensure the Intergovernmental Conference agrees a binding legal mechanism to establish fully and strongly protected MPAs in international waters that enable protection from all types of fishing and other sources of harm.

Campaign for expansion of the global network of MPAs to at a minimum meet the present UN Sustainable Development Goal target of 10% high seas protection.

Campaign for the expansion of MPAs across all the world's oceans, including the high seas, to achieve at least 30% protection in fully and highly protected MPAs by 2030.

Recognise the importance of other area-based management tools in delivering sustainable ocean management, and will work with relevant organisations to strengthen management outside MPAs.

Developing a high seas network of MPAs will require global coordination in order to produce a cost-effective, transparent network design that blends top down strategic conservation planning with bottom up site nomination based on local-knowledge and stakeholder interests. None of the regional bodies in existence at the moment is a candidate to lead this effort, and nor would a devolved process be likely to work, particularly not until the mandate for RFMOs is widened to put environmental protection at the heart of fisheries management. Therefore, BLUE joins calls for a global coordinating body to be responsible for the development and coordination of high seas MPA network establishment.

Linking Action on the High Seas to the UK Blue Belt

BLUE has been highly successful in working with the UK Government to gain protection for UK Overseas Territories under the Blue Belt commitment. This commitment offers opportunities too for expansion into the high seas. MPAs adjacent to UK Overseas Territories could help to increase the level of protection given to MPAs within these territories, by reducing edge effects (Figure 8).

These occur when impacts of activities outside MPAs extend into the protected area. This can happen via direct incursions across the edge of the MPA, or indirectly by the take of animals whose movements straddle the MPA boundary. A high seas MPA could act as a buffer zone to push the international fishing fleet further away from a protected area in national waters (such as around the British Indian Ocean Territory or Pitcairn in Figure 8). High seas protection could also bridge areas of ocean between overseas territories, such as the examples shown in Figure 8 for the Sargasso Sea and between Ascension Island and St. Helena. Such efforts could be augmented if they were extended to include partners in Commonwealth nations, particularly given the recent raised profile of the ocean in the Commonwealth Blue Charter.

BLUE will work with allies in the UK Government, Overseas Territories and Commonwealth to seek protection for areas of the high seas that will augment national protection efforts.

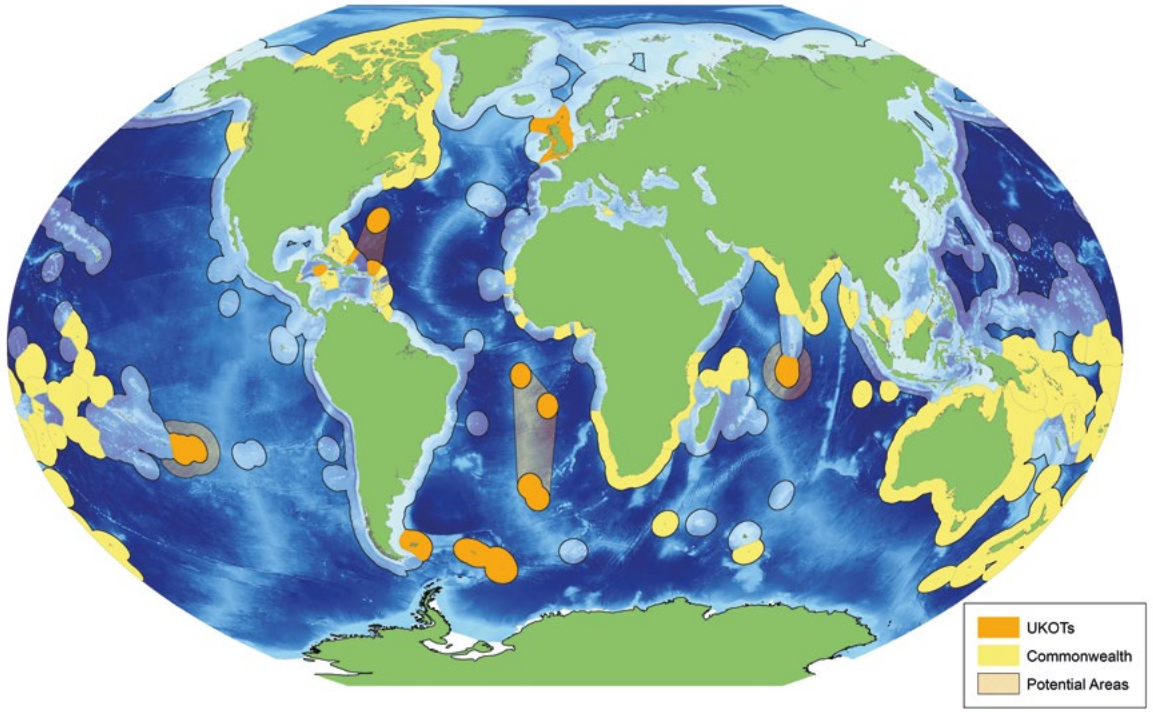


Figure 8: UK overseas territories and commonwealth countries. The map shows, for illustrative purposes only, possible options for complementary protection between the waters of UK overseas territories and adjacent high seas. High seas protection could be used, as in these illustrations, to augment and support protection within national exclusive economic zones.

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