OUR BLUE BEATING HEART

blue carbon solutions in the fight against the climate crisis

A report by the Environmental Justice Foundation

ENVIRONMENTAL JUSTICE FOUNDATION

Protecting People and Planet

Executive Summary

> **We are facing the existential threat of the climate crisis, which will devastate the lives and livelihoods of millions of people and destroy our Earth's natural systems. The ocean is the 'blue beating heart' of our precious planet and its largest ecosystem. A healthy ocean with abundant marine and coastal biodiversity is fundamental to our life on Earth. As the world's largest active carbon sink, the ocean is the greatest nature-based solution for climate change mitigation and its marine ecosystems offer essential adaptation opportunities.[1] Our ocean and coasts provide a natural way of reducing the impact of greenhouse gases: through sequestration of carbon in natural environments including living plants and marine organisms; in the form of organic-rich detritus; or as dissolved organic carbon.[2] The carbon stored in coastal and marine ecosystems is called "blue carbon".[3]**

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Front cover photo: Jorge Vasconez

The ocean: champion for climate mitigation and adaptation

Our ocean drives global systems that make our planet inhabitable for humankind and countless other species. It regulates our oxygen, water, weather, and our coastline ecosystems. According to the World Register of Marine Species, the ocean is home to some 238,000 known species,[4] with an estimated 91% of marine species not yet described by science.[5] The ocean is also our planet's largest carbon sequestration opportunity.[6] Marine vegetated habitats rich in blue carbon such as mangroves, seagrass meadows, intertidal salt marshes, and macroalgae such as kelp, cover only 0.2% of the ocean surface, yet contribute 50% of carbon sequestered in marine sediments.[7] If properly restored and protected, these coastal blue carbon ecosystems alone could sequester up to 200 million tonnes (2%) of the CO2 humans are currently emitting every year.[8] Carbon is also sequestered by the 'powerhouses' of the ocean: phytoplankton, which are thought to contribute up to 45% of the planet's net photosynthesis of CO2,[9,10] as well as by all living organisms in the sea that store carbon in bodies which are buried on the seafloor when they die.[11,12]

A healthy ocean and vibrant blue carbon ecosystems also provide important adaptation opportunities for communities faced with the threat of runaway global heating. Currently, over three billion people depend on marine and coastal biodiversity for their livelihoods,[13] and some 680 million live in low-lying coastal zones,[14] where thriving marine-vegetated ecosystems such as mangrove forests provide a defence against climate threats such as tropical cyclones. A healthy ocean is therefore key to protecting the human rights of communities worldwide, as recognised by the UN's Sustainable Development Goals.

Our ocean under attack

The stability and security of ocean ecosystems are profoundly threatened by global heating and this will damage the other natural systems that we depend on. Under the 2015 Paris Agreement, governments agreed to limit global heating to 1.5°C, but we are falling far behind this goal: the latest UN Emissions Gap Report predicted that under our current emissions trajectory, we could be heading towards at least 3°C of heating by the end of this century.[15] The battle to prevent runaway global heating will also depend on the battle to protect ocean ecosystems and species.

A 2015 study that investigated the cumulative impacts of human activities found that almost the entire ocean (97.7%) is affected by a combination of human-driven stressors.[16] The dominant pressures are the impacts of anthropogenic climate change, such as ocean acidification and increased surface temperatures, as well as effects of the industrial fishing and shipping industries.[17]

The health of the ocean is not only important to our planet, it is also directly linked to more equitable societies and economies, especially for coastal communities. Many of those who depend on ocean and coastal ecosystems, especially in developing nations, belong to marginalised, minority, impoverished or otherwise vulnerable communities, which are often the first and worst affected by pollution, overfishing or climate-driven disasters such as floods and storms. Ocean conservation and climate change mitigation must therefore come hand in hand with sustainable, inclusive and equitable development outcomes for these communities.

The ocean governance gap

Numerous national, regional and global conventions, agreements and programmes have a role in ocean governance, including binding international legal frameworks such as the UN Convention on the Law of the Sea, and non-legally binding agreements like the UN Agenda 2030 and its Sustainable Development Goal 14 and the Aichi Biodiversity Targets signed in 2010, where the world pledged to protect 10% of coastal and marine areas. However, none of these, either individually or collectively, facilitate the level of oversight and governance necessary to ensure truly sustainable and equitable management of our seas and ocean.[18] Additionally, existing marine protected areas (MPAs) too often lack effective management and financial resources, and many are, in fact, simply 'paper parks' with no meaningful management or enforcement capacity.[19] The fact that none of the Aichi Biodiversity Targets were fully met by the 2020 deadline[20] demonstrates how governments have failed to live up to their commitments and give ocean protection the urgent priority it needs.

Prioritising blue carbon conservation

In light of the upcoming Conference of the Parties to the Convention on Biological Diversity (COP 15) and the UN Climate Change Conference (COP 26), it is critical that governments act now to deliver on their promises and show urgent, visionary leadership to protect our ocean, and the people and planet it sustains. The significant carbon sequestration capacity of marine ecosystems demonstrates that the protection of biodiversity and climate mitigation and adaptation are inextricably linked. Therefore, the European Union must lead the international community in setting legally binding, measurable and ambitious ocean protection targets as an inherent part of climate policies. Policymakers around the world must work towards ocean governance that is led by a global, integrated and justice-oriented approach and driven by the collective action of all stakeholders.[21] The experience and knowledge of local communities should be acknowledged and represented in policies and practice, and true participation in ocean and climate action facilitated.

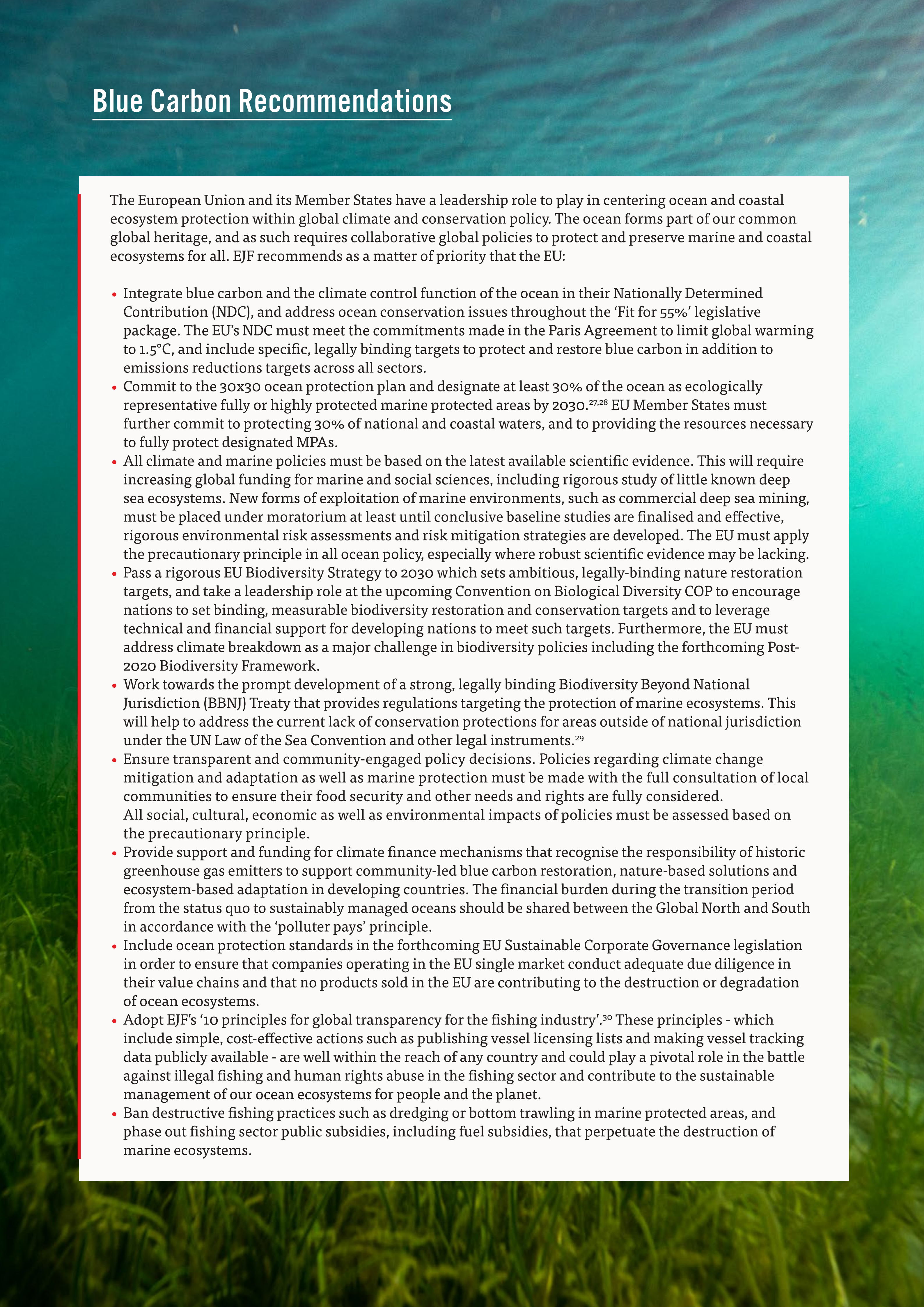
Crucially, the protection of marine ecosystems and biodiversity must not be used as a substitute for ambitious decarbonisation actions, which must take place across all sectors in a 'whole of the economy' approach, in order to meet the targets set out in the Paris Agreement. In this sense, it is critical that we uncover any activities that use the language of the climate emergency as a disguise for unsustainable use of the ocean and jeopardise human rights.

Blue carbon is not a 'silver bullet' for the climate crisis we all face, but realising its importance could pave the way to the much-needed shift towards a holistic approach in tackling the climate crisis. Blue carbon can be one of the tools we use to halt global heating and protect communities from the worst impacts of climate change.

Protecting the ocean means protecting ourselves. The ocean and its flourishing diversity of life depends on our committed actions.

Designed to fail?: European MPAs are not fit for purpose

European seas still lack effective management and impactful conservation measures. According to the European Court of Auditors, the current EU framework for protecting the marine environment does not provide the necessary protection for marine biodiversity, which is threatened by overfishing in European seas.[22] Less than 1% of MPAs in the EU are strictly protected and can be considered effective marine reserves.[23,24,25] To be effective, European MPAs must specifically cover (critically) endangered and vulnerable species and their habitats and restrict fishing in those areas as appropriate.[26]



Blue Carbon Recommendations

The European Union and its Member States have a leadership role to play in centering ocean and coastal ecosystem protection within global climate and conservation policy. The ocean forms part of our common global heritage, and as such requires collaborative global policies to protect and preserve marine and coastal ecosystems for all. EJF recommends as a matter of priority that the EU:

- Integrate blue carbon and the climate control function of the ocean in their Nationally Determined Contribution (NDC), and address ocean conservation issues throughout the 'Fit for 55%' legislative package. The EU's NDC must meet the commitments made in the Paris Agreement to limit global warming to 1.5°C, and include specific, legally binding targets to protect and restore blue carbon in addition to emissions reductions targets across all sectors.
- Commit to the 30x30 ocean protection plan and designate at least 30% of the ocean as ecologically representative fully or highly protected marine protected areas by 2030.[27,28] EU Member States must further commit to protecting 30% of national and coastal waters, and to providing the resources necessary to fully protect designated MPAs.
- All climate and marine policies must be based on the latest available scientific evidence. This will require increasing global funding for marine and social sciences, including rigorous study of little known deep sea ecosystems. New forms of exploitation of marine environments, such as commercial deep sea mining, must be placed under moratorium at least until conclusive baseline studies are finalised and effective, rigorous environmental risk assessments and risk mitigation strategies are developed. The EU must apply the precautionary principle in all ocean policy, especially where robust scientific evidence may be lacking.
- Pass a rigorous EU Biodiversity Strategy to 2030 which sets ambitious, legally-binding nature restoration targets, and take a leadership role at the upcoming Convention on Biological Diversity COP to encourage nations to set binding, measurable biodiversity restoration and conservation targets and to leverage technical and financial support for developing nations to meet such targets. Furthermore, the EU must address climate breakdown as a major challenge in biodiversity policies including the forthcoming Post-2020 Biodiversity Framework.
- Work towards the prompt development of a strong, legally binding Biodiversity Beyond National Jurisdiction (BBNJ) Treaty that provides regulations targeting the protection of marine ecosystems. This will help to address the current lack of conservation protections for areas outside of national jurisdiction under the UN Law of the Sea Convention and other legal instruments.[29]
- Ensure transparent and community-engaged policy decisions. Policies regarding climate change mitigation and adaptation as well as marine protection must be made with the full consultation of local communities to ensure their food security and other needs and rights are fully considered.
  All social, cultural, economic as well as environmental impacts of policies must be assessed based on the precautionary principle.
- Provide support and funding for climate finance mechanisms that recognise the responsibility of historic greenhouse gas emitters to support community-led blue carbon restoration, nature-based solutions and ecosystem-based adaptation in developing countries. The financial burden during the transition period from the status quo to sustainably managed oceans should be shared between the Global North and South in accordance with the 'polluter pays' principle.
- Include ocean protection standards in the forthcoming EU Sustainable Corporate Governance legislation in order to ensure that companies operating in the EU single market conduct adequate due diligence in their value chains and that no products sold in the EU are contributing to the destruction or degradation of ocean ecosystems.
- Adopt EJF's '10 principles for global transparency for the fishing industry'.[30] These principles - which include simple, cost-effective actions such as publishing vessel licensing lists and making vessel tracking data publicly available - are well within the reach of any country and could play a pivotal role in the battle against illegal fishing and human rights abuse in the fishing sector and contribute to the sustainable management of our ocean ecosystems for people and the planet.
- Ban destructive fishing practices such as dredging or bottom trawling in marine protected areas, and phase out fishing sector public subsidies, including fuel subsidies, that perpetuate the destruction of marine ecosystems.

30 x 30 – Protecting at least 30% of the ocean by 2030 with an effective marine protected areas network

At the 2016 World Conservation Congress, the International Union for the Conservation of Nature (IUCN) members agreed to a marine protection target: to designate and implement at least 30% of each marine habitat in a network of highly protected marine protected areas. The IUCN calls on the parties to the Convention on Biological Diversity (CBD) to include this target in the post-2020 targets.[31] Currently, only 7.66%[32] of the global ocean is covered by MPAs.[33] Furthermore, these MPAs only protect an estimated 1.18% of the area beyond national jurisdiction, meaning that the high seas -- which make up roughly 61% of the global ocean surface - are almost completely unprotected.[34]

In addition, existing MPAs face insufficient financial and human resources needed to improve ocean health. A study by a team of 22 international scholars has shown that sufficient budget and staff can contribute to higher effectiveness of MPAs (as measured by the health of fish populations). In contrast, some of the MPAs lacking financial and human resources were found to have low positive impacts for marine conservation.[35] Therefore, simply designating 30% of the ocean as MPAs is not sufficient: governments must commit to providing the necessary resources to ensure MPAs can meet their conservation goals.

Another key element for effective marine conservation is the synergy between MPAs. States should prioritise creating MPA networks that work “cooperatively and synergistically, at various spatial scales, and with a range of protection levels that are designed to meet objectives that a single reserve cannot achieve”.[36] States must carefully assess the biological traits and place, size and space to form a coordinated MPA network to maximise the ecological benefits.

Justice-oriented ocean policies and economies

For too long, unsustainable development and extractive industries have driven the degradation of marine ecosystems. Access to ocean resources is not equitably distributed: a recent study showed that in 2018, the top 100 companies in ocean industries captured 60% (US$1.1 trillion) of the US$1.9 trillion in total revenues generated.[37] This concentration of wealth and power in the ocean economy threatens the human rights of those who work in small-scale fisheries, who make up over 90% of those employed in fisheries worldwide, and of whom 97% live in developing countries.[38,39] These people are often drawn from the communities with the deepest relations to, and knowledge about, a region’s ecosystems, and who bear the least historical responsibility for environmental abuses and greenhouse gas emissions.

However, ocean conservation policies still tend to overlook issues of equity and environmental justice.[40] In order to build a just and sustainable ocean conservation system, we must address the “Triple Crises” of climate change, biodiversity loss, and human rights abuses as interlinked parts of the same problem. Therefore, the strategies we need to protect at least 30% of the ocean must respect and integrate locally led, holistic ocean stewardship and social equity.[41,42] Transparency in marine conservation decision-making is key to ensure that the rights and livelihood needs of local and indigenous communities are respected, their participation and leadership secured, and to fully integrate their knowledge in all decision-making processes – based on free, prior and informed consent and the acknowledgment of the diversity of these groups.

Sea forests: silent defenders against climate breakdown

Coastal 'sea forests' including kelp, salt marshes, seagrass meadows and mangrove forests have an extraordinary ability to absorb carbon. These blue carbon ecosystems are a critical element of a nature-based intervention plan for fighting global heating.[43]

Mangroves

Mangroves are salt-tolerant trees and bushes that line the coasts of tropical and subtropical countries. Covering approximately 0.4% of global forested area,[44] mangrove forests support a wide range of biodiversity including herbivorous marine mammals such as manatees and dugongs. The canopy also provides a key habitat for numerous insects, various monkey and bird species.[45] They act as both breeding and nursery grounds and provide essential food for juvenile fish, thus supporting fisheries worldwide.[46] In Micronesia, for example, the local crab fishery benefits by up to US$423 a year per hectare of mangroves[47], while the global median value of benefits to small-scale inshore mixed species fisheries is estimated at around US$106 per hectare per year.[48]

Mangroves also provide other irreplaceable ecosystem services for coastal communities: over 100 million people are estimated to live within 10 kilometres of large mangrove forests, the vast majority in developing countries.[49] These ecosystem services range from timber and food security to protection from storm surges.[50] For example, when Typhoon Haiyan hit the Philippines in 2013, villages with lower levels of damage and fatalities attributed their protection to mangroves forests buffering wind and wave energy.[51] A World Bank study estimated that without the protection of existing mangrove forests, an additional 613,000 people in the Philippines would suffer from flooding annually, and damage to property would increase 28% to more than US$1 billion per year.[52] Mangroves' role as fish nursery grounds also support community livelihoods: a study in India estimated that healthy mangrove root systems contributed an additional 23% to fishery output (in the study area).[53]

One of mangroves' most important ecosystem services is their contribution to climate change mitigation. Mangrove forests can store up to four times more carbon per hectare than terrestrial tropical forests,[54] at an annual rate of 23 million tonnes.[55]

A woman participating in the community-based mangrove conservation project at Gazi Bay, Kenya. Picture credit: WWF Kenya

In total, mangrove ecosystems currently store an estimated 3.7 to 6.2 billion tonnes of carbon,[56] a majority of which is stored in the soil and in the dead, below-ground roots of mangroves habitats.[57] However, the destruction of mangrove ecosystems can convert this powerful carbon sink into a major carbon emitter. Because mangroves are more efficient at absorbing carbon, when destroyed, their carbon emission per hectare is also higher than other types of forest ecosystems: emissions from mangrove deforestation accounts for up to 10% of all greenhouse gas emissions from tropical deforestation, despite representing only 0.7% of tropical forest area worldwide.[58] Therefore, the protection of mangrove ecosystems is critically important in the era of 'net zero'.

Net global mangrove cover decreased by more than 6000 square kilometres from 1996 to 2016.[59] Although the rate of deforestation has slowed in the past decade,[60,61] IUCN estimates that 67% of mangroves have been lost or degraded worldwide, and that all unprotected mangroves could be lost within the next 100 years.[62] Up to 62% of the losses in mangrove areas from 2000-2016 were driven by land use change.[63] Mangroves are most under threat from deforestation for logging or burning for conversion of the land to aquaculture, agriculture (such as rice fields and palm oil plantations) or coastal developments.[64]

One of the most damaging and widespread causes of mangrove forest destruction is the conversion to shrimp aquaculture. Shrimp farms were responsible for 65% of the mangroves lost in Thailand from 1976 to 1991.[65] To make matters worse, shrimp farms are often abandoned after about five years due to damaged, acidic soils and deteriorating water quality.[66] Once shrimp ponds are abandoned, they can only store approximately 11% of the carbon that healthy and biodiverse mangrove forests can.[67] The damage caused by conversion to shrimp farms is not easily reversed, and researchers have not found clear patterns of recovery in soil carbon stocks after farms are abandoned.[68]

The destruction of mangrove forests is also an issue of injustice. Mangrove destruction threatens the livelihoods of coastal communities who depend on healthy mangrove forests for fisheries, water and storm protection. Without mangroves, coastal communities are more vulnerable to the impacts of global heating and extreme weather, even though they are responsible for very little historical greenhouse gas emissions. Destroyed estuary ecosystems contribute to decreases in global fish stocks and increase concerns over food security. Conserving and restoring mangroves worldwide is critical for mitigating climate change and protecting the human rights of those most vulnerable to the dangerous impacts of global heating.

Seagrasses

Covering only 0.2% of oceans, seagrasses can absorb carbon at a rate of 27.4 million tonnes of carbon per year, which is about 10% of the total carbon stored in oceans.

Seagrass meadows comprise flowering plants living in the intertidal to shallow subtidal areas, covering 0.2% of the world's ocean across all latitudes.[69] Seagrasses perform vital ecosystem functions, supplying food and shelter for fish, birds, reptiles and marine mammals, including a host of iconic species, such as seahorses, marine turtles, dugongs and manatees.

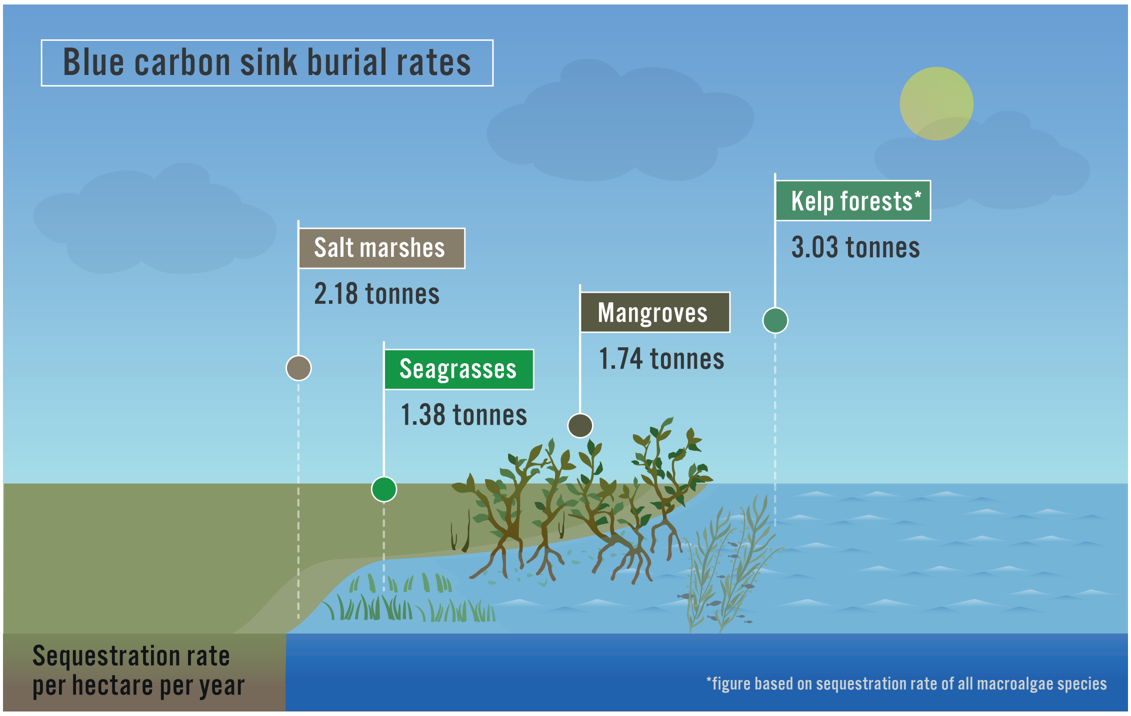
In terms of ecosystem services, seagrasses play a critical role as the breeding grounds and nurseries that underpin healthy fish populations.[70] These services not only benefit the wildlife underwater: in some regions, commercial fisheries attribute more than 30% of their value to healthy seagrass ecosystems.[71] Seagrass meadows' canopies and underground roots also work to stabilise sediments by reducing wave energy.[72] They can protect the coast from erosion and reduce the vulnerability of local communities to tidal surges, sea level rise and extreme weather events.

Healthy seagrass meadows can enhance the resilience of coexisting coral reefs to ocean acidification, thus helping to protect the rich biodiversity of coral ecosystems which are under threat in our heating ocean.[73] Coral reefs are some of the most biodiverse biomes in the world, and their ecosystem services contribute to the livelihood and food security of more than 500 million people.[74] Their ability to buffer wave energy have also made them crucial to island states, and some countries have started restoring coral reef ecosystems as an adaptation strategy to the rising risk of extreme weather events due to climate change.[75] However, coral reefs are also extremely vulnerable to the ocean acidification resulting from climate change,[76] with devastating impacts for ocean biodiversity and the communities dependent on them. Protecting seagrass meadows is one way to help conserve vibrant coral reef ecosystems.

Seagrasses are also important stores of blue carbon. Scientists estimate that global seagrass ecosystems may store up to 19.9 billion tonnes of carbon.[77] Seagrasses can absorb carbon at a rate of 27.4 million tonnes per year, which is about 10% of the ocean's total annual carbon sequestration.[78] Seagrass meadows can store twice as much carbon as terrestrial soils, making them one of the most efficient carbon sequestration ecosystems in the world.[79]

However, like mangroves, the degradation of seagrass ecosystems turns these carbon sinks into carbon sources. At the current rate of degradation, seagrass loss could result in the emission of up to nearly 300 million tonnes of carbon every year.[80]

Urgent action is required to protect and restore critical seagrass ecosystems. Seagrass meadows globally are threatened by runoff from urban, industrial and agricultural activities, infrastructure development, and seabed dredging by fishing boats.[81] After damage to seafloors by bottom trawlers, it can take decades before ecosystems recover.[82]



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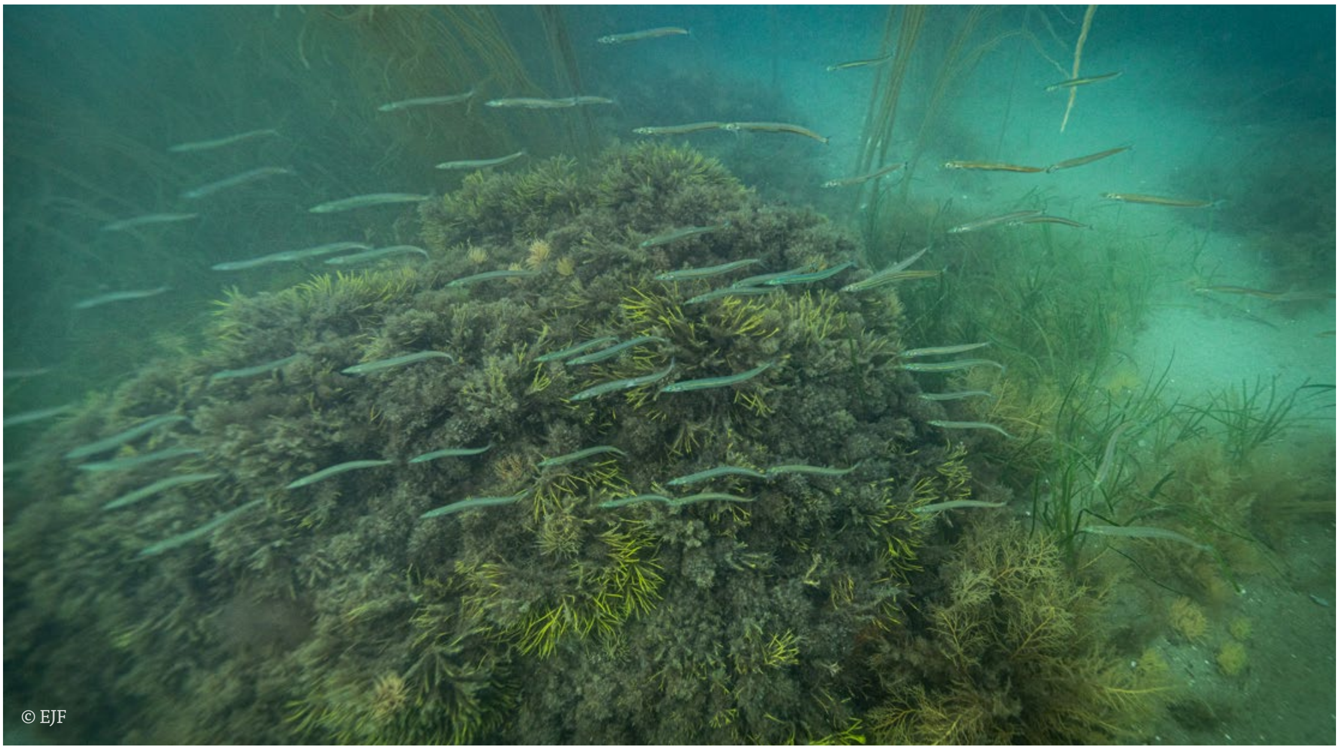
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Kelp forests

Kelps are large brown algae that can grow to 30 metres in length, and live in relatively shallow nutrient-rich coastal waters.[83] Kelp forests cover an estimated 1,469,900 square kilometres of the ocean, around 22% of the planet's coastlines.[84] Similar to mangroves and seagrass, kelps host an abundance of biodiversity: a wide range of fish, marine mammals - including sea otters, seals and whales - and invertebrates that feed on and take refuge in kelp forests.[85]

In the battle against climate change, kelp forests demonstrate an extraordinary ability to store and sequester carbon. Researchers estimate that macroalgae like kelp could sequester around 173 million tonnes of carbon a year globally.[86] Another study by Australian scholars found that kelp across the Great Southern Reef can store more than 1.3 million tonnes of carbon per year: equivalent to over 30% of the blue carbon stored around the Australian continent.[87] Furthermore, as fertilizer, kelp can reduce emissions on land by improving soil quality; and when fed to livestock, it can help reduce methane emissions.[88]

Kelp forests are under increasing pressure. The depletion rate is around 2% per year,[89] due to climate change, pollution, fishing, invasive predators and overharvesting for the production of alginate, used in the food, textiles and pharmaceutical industries.[90] The threats of climate change lie not only in the rising seawater temperature, but also in the changes in microbiome due to ocean acidification. Studies have shown that when treated with acidified seawater, kelp species show disease-like symptoms and die.[91] These results paint a worrying picture for the future of kelp forests unless action is taken today to protect this critical ecosystem.

Intertidal salt marshes

Intertidal salt marshes are coastal wetlands that are flooded and drained by salt water. Salt marshes are rich and unique biodiversity hotspots, providing homes and feeding grounds for an array of wildlife including migratory birds as well as commercial fish nurseries.[92] Salt marshes also have extremely high rates of carbon accumulation: globally, salt marsh sediments have an average carbon accumulation rate of approximately 2.1 tonnes per hectare per year.[93] In addition to carbon sequestration, salt marsh ecosystems provide other important services such as regulating soil nutrient biogeochemical cycles,[94] erosion control and protecting coastal communities from flooding and storm surges.[95]

Salt marshes worldwide are under threat from human activity such as urbanisation and land use change for agriculture, as well as being jeopardised by the impacts of anthropogenic global heating including sea level rise and extreme weather events.[96] Approximately 49.8% of coastal natural wetlands - which include salt marshes - worldwide have been lost or degraded since 1900,[97] and a further 30-40% may be lost over the next century under the current emissions trajectory.[98]

Table 1: Comparing the power of major carbon sinks

Ecosystem	Global coverage (km2)	Sequestration rate per hectare per year	Annual rate of degradation
Tropical forest	18,341,360[99]	0.74 tonnes[100]	0.5%[101]
Mangrove forest	147,860[102]	1.74 tonnes[103]	0.16%[104]
Seagrass meadows	266,562[105]	1.38 tonnes[106]	7%[107]
Salt marshes	54,950.89[108]	2.18 tonnes[109]	1-2%[110]
Kelp forests	1,469,900[111]	3.03 tonnes[112] **figure based on sequestration rate of all macroalgae species*	2%[113]

Governance and policies

'Sea forests' are crucial to ecosystem functioning, climate mitigation and adaptation and human well-being as a whole. However, their importance is not fully recognised at either the international or national level and their current level of protection does not correspond to their critical role. Even though globally, 295 Ramsar sites of international importance encompass mangrove forests, 57 sites hold seagrass beds, 472 hold intertidal marshes, and 13 sites have kelp beds,[114] even designated Ramsar sites are threatened by lack of enforcement of conservation goals, shortages of human and financial resources for conservation, and lack of clarity around their protective governance.[115]

Nature-based solutions - the mitigation and adaptation approaches based on natural habitats' ecosystem services - are gaining policy makers' attention as a complement to decarbonisation action, to strengthen our planet's own carbon cycle, protect biodiversity from a 'Sixth Great Extinction' event, and safeguard the lives and livelihoods of vulnerable communities worldwide.

However, even though sea forest ecosystems are effective nature-based solutions in the fight against global heating, of the 197 countries that have signed the Paris Agreement to date, only 64 countries (approximately one third) made a general mention of coastal and marine ecosystems in their first NDCs.[116] Even fewer have set specific conservation targets: only the Bahamas set a measurable target for both seagrass and mangrove protection, and Haiti, Madagascar, Senegal and Vietnam set specific targets for mangrove protection.[117]

The most pertinent existing international governance mechanism for the protection of sea forest ecosystems is the Convention on Biological Diversity (CBD).[118] The CBD's Aichi Biodiversity Targets (2011-2020) covered the protection of sea forests under targets 6, 7, 11, and 14 due to their irreplaceable role in a healthy ocean,[119] but the world failed to meet even a single one of the biodiversity targets by the 2020 target date.[120] The 2030 Global Biodiversity Framework will be settled at the 2021 UN Biodiversity Conference, COP 15, but in order to avoid a repeat of the Aichi Targets' failures, global leaders will need to back up ambitious protection targets with measurable and binding implementation plans at the national, regional and international level.

At the regional level, there are several laws under the European Union framework to protect nature and biodiversity. Salt marshes and one species of seagrasses, *Posidonion oceanicae*, is included in Annex I of the Habitats Directive, but other common seagrass species under threat in the EU do not receive recognition.[121,122] The EU also established the European Red List of Habitats to assess the conservation condition of habitats in Annex I,[123] but these critical ecosystems continue to be threatened due to the lack of legal enforcement across Member States.[124]

Photo from a seagrass restoration project in Dale Bay, Wales. © EJF

Community-based conservation approaches for coastal ecosystems

While top-down regulations are important in conservation, bottom-up participation is key to sustainable, long-term environmental protection. Community-based conservation projects around the world have demonstrated success in protecting the ecosystem and the rights of local people.

In Kenya, the Gazi Bay community provides an example of such success. The ecosystem services provided by local mangrove forests are essential to this fishing community. The Mikoko Pamojo conservation project, founded in 2013, is led by local people with funding from the sales of voluntary carbon credits based on the carbon sequestration capacity of the mangrove forests.[125] With the sustainable income from carbon credits, the community is able to restore and enhance the ecosystem and its services. Apart from the conservation incentives of the carbon credits, the community receives further benefits from other mangrove-related income, such as ecotourism. The funds generated help to meet the community's development needs such as infrastructure and education.

The Gazi Bay project is an example of a successful community-led conservation project and is a model for how to address climate, biodiversity and human rights needs together in a mutually-reinforcing and beneficial way. However - as with all blue carbon solutions - purchasing carbon credits (even ones linked to successful community development projects) cannot be used by companies or governments as a replacement for rapid decarbonisation or seen as a license to deforest elsewhere. Blue carbon restoration projects can be part of a successful climate mitigation solutions portfolio, but they are not a 'silver bullet'.

EJF recommendations on 'sea forests'

'Sea forests' can be powerful allies in our fight against climate breakdown, but only if we act now to protect them.

1. The global community must urgently prioritise the conservation and restoration of mangrove, seagrass, salt marsh and kelp ecosystems as part of their NDC implementation plans under the Paris Agreement.

2. The EU's forthcoming Biodiversity Strategy to 2030 must include specific targets for the protection and restoration of seagrass ecosystems in the region, include sufficient financial and human resources for conservation targets, and work to integrate coastal conservation across its "Fit for 55%" legislation package.

3. International climate finance mechanisms should help with transferring funds from developed countries directly towards support for conservation, or "seaforestation", efforts in Least Developed Countries and Small Island Developing States. These conservation efforts should include setting national level binding science-based targets for MPAs to protect and restore mangrove, seagrass, salt marsh and kelp ecosystems.

4. Governments must also work together with local communities to ban the destruction of sea forests for aquacultural and agricultural expansion. Destructive fishing practices such as dredging or bottom trawling must also be phased out, including immediate bans on trawling in MPAs.

5. Rigorous value chain due diligence regulations must be applied to ensure consumer goods, including fisheries and aquaculture products, are coming from legal, sustainably managed fisheries and farms. The EU must cover mangrove, seagrass, salt marsh and kelp conservation in its forthcoming sustainable corporate governance framework and the pending deforestation-free supply chain legislation, to ensure that products placed on the European single market do not contribute to the destruction of these critical ecosystems worldwide.

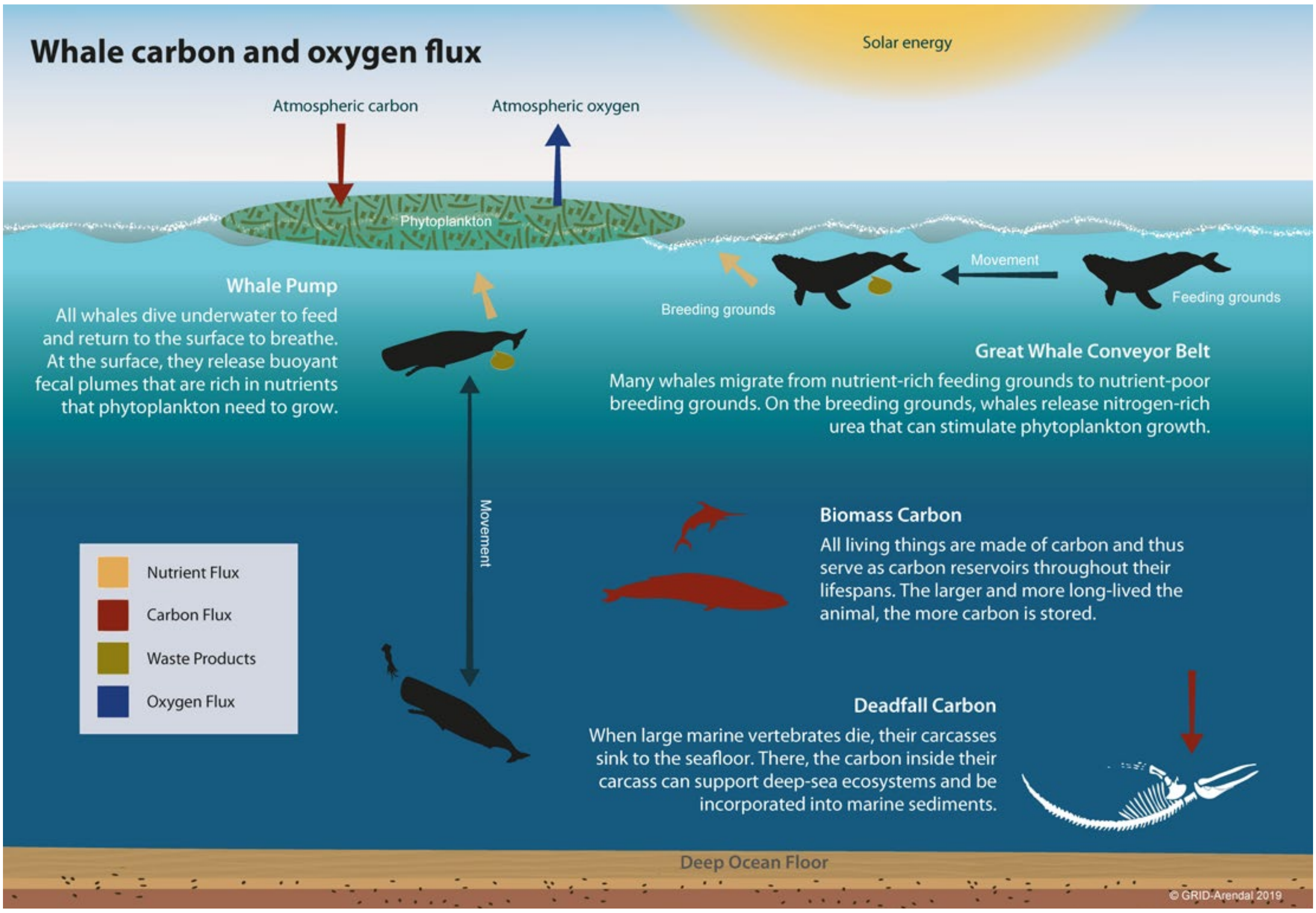
Cetaceans: our underwater allies for climate action

Cetaceans - whales, dolphins and porpoises - are charismatic keystone species central to a healthy ocean ecosystem. In the last decade, research has indicated that the great whales - the 13 species of large whales including the Blue whale (*Balaenoptera musculus*), Fin whale (*Balaenoptera physalus*) and North Atlantic right whale (*Eubalaena glacialis*) - have positive impacts on the oceanic biological carbon cycle.[126,127] Recent research has revealed that although cetaceans have often not been counted in most carbon cycling models, they may have important impacts on the oceanic carbon cycle.[128,129]

Whales, primary production and the carbon cycle

Phytoplankton is the driving force in a process called the ‘biological carbon pump’ that takes place throughout the ocean. The organisms fix significant amounts of carbon from the atmosphere and sequester it in the ocean.[130,131] Phytoplankton is thought to be responsible for at least 45% of the global photosynthetic net primary production,[132,133] playing a key role in a stable climate[134] and contributing at least half of the world’s oxygen.[135]

Great whales have a positive impact on the primary production of phytoplankton. Phytoplankton is fertilised by whale faeces, which contains the iron and nitrogen these microorganisms need to flourish. Many cetacean species feed at depth and their diving brings more minerals up to the surface; the mechanism through which whales transport nutrients is known as the ‘whale-pump’.[136] In addition, whale migration patterns to low-latitude areas - the so-called ‘whale conveyor belt’ - help to circulate these nutrients to nutrient-poor regions.[137] In this way, the behavioural habits of cetaceans stimulate new primary production, create a multiplier effect of increasing phytoplankton,[138,139,140] promote carbon uptake in the ocean[141,142] and enhance ecosystem productivity.[143]



Whale Pump
All whales dive underwater to feed and return to the surface to breathe. At the surface, they release buoyant fecal plumes that are rich in nutrients that phytoplankton need to grow.

Great Whale Conveyor Belt
Many whales migrate from nutrient-rich feeding grounds to nutrient-poor breeding grounds. On the breeding grounds, whales release nitrogen-rich urea that can stimulate phytoplankton growth.

Biomass Carbon
All living things are made of carbon and thus serve as carbon reservoirs throughout their lifespans. The larger and more long-lived the animal, the more carbon is stored.

Deadfall Carbon
When large marine vertebrates die, their carcasses sink to the seafloor. There, the carbon inside their carcass can support deep-sea ecosystems and be incorporated into marine sediments.

Whale carbon and oxygen flux - mechanisms through which cetaceans, and marine vertebrates in general, contribute to the oceanic carbon cycle.
Image credit: GRID-Arendal | www.grida.no/resources/14276

Photo: Brodie Guy (CC BY-NC-ND 2.0)

Whales' waste products stimulate phytoplankton growth.

Like all living beings, great whales capture carbon from the atmosphere by accumulating it in their bodies.[144] Some researchers have estimated that each great whale sequesters 33 tonnes of CO2 on average when they die and sink.[145] When a whale dies of natural causes, its carcass sinks to the seafloor where the carbon stored in their body remains for centuries and provides habitat and nutrients for deep-sea species.[146,147] Based on reconstructions of pre-whaling abundances, scientists of the University of Maine and the University of British Columbia estimate that "rebuilding whale populations would remove 1.6×10^5 tons of carbon each year through sinking whale carcasses".[148]

These mechanisms are examples of marine vertebrates' carbon services and also illustrate how whales enhance ecosystem productivity, for example by stimulating the growth of fish populations.[149] However, whales, just like fish, have been unsustainably targeted by human activity, leading to the release of their carbon back into the atmosphere.

Today, from a global perspective and due to commercial whaling in the past, whales' contribution to carbon sequestration is significantly reduced. Their exact contribution to global carbon fluxes and nutrients remains uncertain to a large extent. However, they play a key role in local and regional ecosystem function and recovering their stocks could form part of a blue carbon action plan for climate mitigation.[150,151]

The interconnectedness of marine wildlife and carbon sequestration highlights the need to align biodiversity and climate mitigation policies. Great whales might not be the 'silver bullet' to our climate crisis. But the largest animals to have ever lived on Earth are among the greatest allies we have. They demonstrate that the ocean in its boundlessness belongs to all living beings - if we protect it, we protect ourselves.

Overfishing and the threat to blue carbon stores

The role of whales is the perfect example of how marine life contributes to a stable climate and can act as a carbon sink. However, they are not the only species playing a key role in the ocean's ability to store carbon.[152] Top predators such as sharks help preserve ecosystem integrity by controlling herbivore populations. If shark populations diminish, plant communities decrease as herbivores consume more of the flora, such as mangroves and seagrasses, that store carbon from the atmosphere.[153,154] This cascading process caused by the loss of apex predators and the subsequent proliferation of lower trophic level species is known as trophic downgrading, and can result in dramatic changes to community structure and overall ecosystem functioning.[155] To date, the impacts of the loss of species high in the food chain and the implications for the carbon cycling role remains poorly studied.[156]

Just like whales, sharks also store carbon in their bodies. But overfishing drastically reduces their populations – and once removed from the ocean, this carbon is released to the atmosphere.[157] A recent study found that "since 1970, the global abundance of oceanic sharks and rays has declined by 71% owing to an 18-fold increase in relative fishing pressure".[158]

Sustainable fishing practices are key to restoring and maintaining the ocean's biodiversity and biomass, and contribution to the oceanic biological carbon cycle.[159] Researchers estimate that ocean fisheries have driven the release of at least 0.73 billion metric tonnes of CO2 ($GtCO_2$) in the past 70 years.[160] Industrial fishing is largely responsible for reducing the carbon sink potential of fish biomass. Yet governments continue to provide public money as subsidies that underpin and perpetuate unsustainable fishing activities. These subsidies are not only harming the health of our ocean through overfishing: in the form of fuel subsidies, they also underwrite increased greenhouse gas emissions and lock in dependence on fossil fuels. According to a recent report published in *Science Advances*, around 43.5% of the blue carbon extracted from the high seas comes from areas that would be unprofitable without subsidies.[161,162]

Industrial marine activities like fishing and shipping play a large role in reducing the carbon sink potential of the ocean. Scientists estimate that more than 40% of the blue carbon released globally is related to fishing activities alone. © EJF

Threats to the great whales

Until the mid-20th century, commercial whaling was the main threat to whale populations: estimates suggest that 66-90% of the global whale population or 85% of its biomass was eliminated during the long period of commercial whaling.[163] This has resulted in significant declines in the amount of carbon stored by whale populations: scientists, for example, found that populations of large baleen whales today store 9.1 million tonnes less carbon than before commercial whaling.[164] Currently, 12 out of the 13 great whales are listed in Appendix I of the Convention on International Trade in Endangered Species (CITES), while four cetacean species and 18 subspecies or subpopulations of cetacean are currently classified as Critically Endangered, and a further 11 cetacean species are classified as Endangered, on the IUCN Red List.[165]

Although commercial whaling activity has reduced significantly during recent decades, whales still face numerous direct and indirect threats from human activities. As global demand for seafood continues to grow, so does fishing, including vessels that engage in illegal or destructive practices. Although dolphins and whales might not be the main target of most fishing vessels, they are often caught as bycatch when they become entangled in fishing nets or other gears.[166] EJF has documented high rates of cetacean bycatch by tuna longline fishing vessels, and found that vessels targeting sharks may intentionally catch dolphins to use as bait.[167, 168] 'Ghost' fishing nets that are abandoned by fishers and left drifting in the ocean are often a deadly trap for marine animals: it has been estimated that each year, 600,000 to 800,000 metric tonnes of ghost gear enter the ocean, killing at least 136,000 seals, sea lions and whales.[169, 170] Other threats from human maritime activities include vessel strikes, noise and chemical pollution.[171] Cetaceans are also severely affected by the climate crisis through the warming and acidification of the ocean and the depletion of their food sources.[172,173,174] As ocean temperatures continue to rise due to global heating, cetacean populations will be pressured yet further, undermining their contributions to the global carbon cycle.

Governance and policies

It was not until 1986 – when whale populations were on the brink of collapse – that the International Whaling Commission (IWC) finally agreed to a moratorium on most commercial whaling,[175] but many gaps remain in the protective governance of cetaceans.

The conservation of cetaceans must be based on an understanding of their role within the whole marine ecosystem. In 2016, the IWC acknowledged the important role of cetaceans "to ecosystem functioning"[176] including carbon sequestration, which has sparked new conversations on protecting cetaceans at the

It is conservatively estimated that 600,000 to 800,000 metric tonnes of ghost gear enter the ocean annually, which are estimated to kill at least 136,000 seals, sea lions and whales every year.

Aerial view of North Atlantic right whale that a team of state and federal biologists assisted in disentangling off Daytona Beach.
Photo credit: NOAA News Archive 123110, (CC BY 2.0)

international level. However, no firm commitments have yet been made and the full and effective integration of cetaceans' ecosystem services into international decision-making is still falling behind.

The issue of cetaceans killed by commercial fishing, whether intentionally or as bycatch, has yet to be sufficiently addressed in regional and international high seas governance bodies such as Regional Fisheries Management Organisations.[177] EJF's investigations[178] and scientific research[179,180,181] have shown that intentional and unintentional catch of cetaceans by longliners are too significant to be ignored. Some of the EU and Member State-specific rules regulating the domestic fishing industry represent a first step in the protection of cetaceans and other marine vertebrates, such as the EU Habitats Directive, Marine Strategy Framework Directive, the Regulation on the conservation of fishery resources and the protection of marine ecosystems through technical measures, and the Common Fisheries Policy. However, there is no comprehensive plan and significant gaps remain,[182] especially in terms of proactive measures governing long-distance fleets and foreign vessels importing seafood with high bycatch rates into the EU single market.

Humanity and the environment are at the critical stage between survival and extinction. Marine biodiversity can be restored, and therefore help protect humanity, if major threats including climate change are mitigated. But we have been slow to act and we are running out of time.

The global community has yet to systematically address a number of other key threats to cetaceans, for example collisions between cetaceans and vessels at sea.[183] Researchers are still collecting data to identify collision hotspots and methods to reduce the number of incidents, while methods such as limitation of vessel speed, changing shipping lanes, applying acoustic alarms, and raising public awareness have been applied by individual states or regional organisations, with varying degrees of success.[184,185] A key concern is that existing MPAs and conservation strategies do not fully reflect how global heating will affect migratory routes and species distribution in future years, potentially eroding existing protections for cetaceans.[186,187]

EJF recommendations on cetaceans

1. We urgently need holistic, joined-up action based on cross-sectoral approaches to rebuild marine life-support systems and restore marine habitats.[188,189] Ocean-based targets and cetacean and other marine biodiversity conservation should be integrated into climate mitigation, resilience and adaptation policies as well as into international and national climate objectives, NDCs and National Adaptation Plans.[190] The CBD and a stronger, binding successor to the Aichi Biodiversity Targets must be integrated into the implementation of regional, national and international climate policies, and should specifically consider the role of cetaceans and strengthen the development of policies for nature-based solutions and blue carbon.
2. To protect biodiversity and ecosystems beyond national jurisdiction, we need a carefully managed global network of interconnected highly or fully protected MPAs with consideration of climate change impacts on cetacean species.[191] This must be backed by the necessary funds to ensure that MPAs are effectively managed to protect people and the planet.

EJF further calls on states to work collaboratively to address and regulate other threats to cetaceans including initiatives to eliminate cetacean bycatch and destructive illegal fishing practices; clean up dangerous 'ghost gear'; prevent and address plastic, noise, light and chemical pollution of marine ecosystems; and take action to prevent vessel strikes. Implementing EJF's 'Ten principles for global transparency in the fishing industry' can further help protect cetaceans from illegal fishing practices.

Deep sea mining: a threat to people and planet

Deep sea ecosystems begin at around 200 metres below the waves, where the sunlight fades, to the deepest parts of the ocean at around 11,000 metres in depth.[192] The deep sea covers 65% of the planet's surface[193] and is one of the last unknown frontiers of scientific knowledge on Earth. Thousands of metres below the ocean waves lie rich and varied landscapes of plains and hydrothermal vents, canyons and seamounts, where scientists hope to one day learn more on the climate control effect of the ocean, discover life-saving medicines, and gain new understandings of how life on Earth evolved. Scientists are not the only ones with their eyes on the deep: the mining industry has also set its sights on the deep sea for the extraction of valuable metals and minerals like cobalt and manganese used in smartphones and electric car batteries.

Deep sea mining (DSM), the process of retrieving minerals from the deep sea, is planned to start on a commercial scale as soon as the international legal framework governing it – the Deep Sea Mining Code – is finalised.[194] In June 2021, the government of Nauru invoked the 'two-year rule', declaring its intention to begin commercial DSM activities and setting a deadline for the finalisation of the Code.[195] Large-scale mining operations in ecosystems which we do not fully understand, with untested extractive technology, could have catastrophic impacts on global ocean ecosystems, marine ecological security, and the 3 billion people worldwide who depend on the ocean for their livelihoods.[196] We simply do not know enough about the world below the waves to control the environmental impacts of deep sea mining at this point, and we currently lack effective, impartial governance tools to manage a new extractive industry in this global commons. We have already seen the destruction of terrestrial mining and fossil fuel companies drilling and scraping up whole biomes, increasing global inequality, committing horrific human rights abuses, and driving consumption past planetary boundaries: we cannot continue this pattern of devastation in the ocean. We must act now to protect the deep sea for people and the future of our planet.

Deep sea biodiversity

We know very little about the deep sea. Currently, less than 20% of the deep sea is mapped by modern technology,[197] and this ignorance has hampered the fair assessment of impacts and effective management of DSM. The United Nations has therefore set 2021-2030 as the United Nations Decade of Ocean Science for Sustainable Development[198] and launched a project aiming for better understanding of seabeds, the Seabed 2030 Project,[199] to close the knowledge gap and develop science-based ocean policies.

Popular imagination has traditionally seen the deep sea as barren plains of sand, hostile to life. But the reality is completely different. A striking example of this is one of the most sought after areas in DSM exploration, the swath of ocean in the Pacific known as the Clarion Clipperton Fracture Zone (CCZ). This area covers around 4.5 million square kilometres[200] – an area larger than

Around 90% of the species collected in the CCZ are new to science, including some rare specimens not found anywhere else in the ocean.

Pictures credit: NOAA Ocean Exploration & Research, (CC BY-SA 2.0)

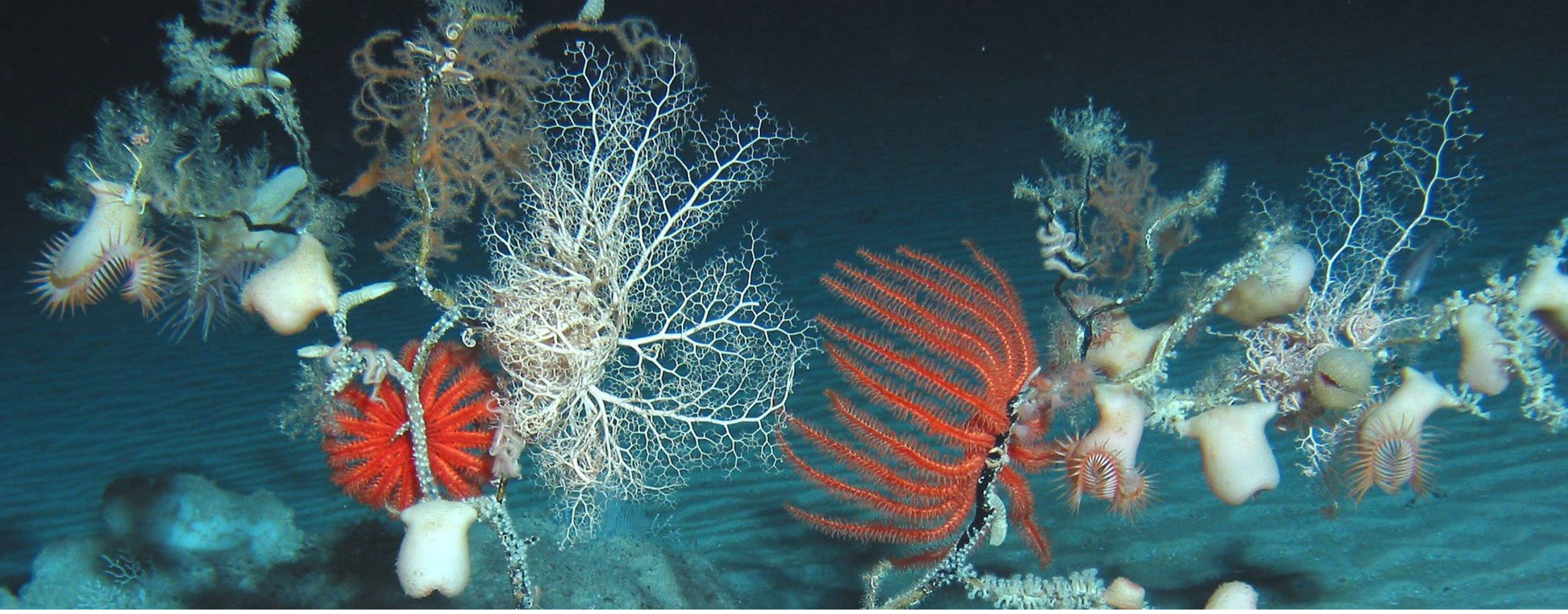


Photo credit: Bioluminescence 2009 Expedition, NOAA/OER, (CC BY 2.0)

the European Union - and 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.[201] Deep-sea biologist Craig Smith at the University of Hawaii in Honolulu has spent 30 years studying the ecosystems of the CCZ, and has collected many different varieties of underwater life such as soft corals, starfish, sea urchins, sea cucumbers to name only a few: around 90% of the species he has collected are new to science, including some rare specimens not found anywhere else in the ocean.[202] Even with this bounty of biodiversity discovered, the deep sea remains a mystery: scientists estimate that they have only sampled 0.01% of the CCZ.[203]

The deep sea and climate control

The deep sea plays an essential role in the ocean as a carbon sink. The burial of organic carbon in the sediment of the deep sea bed helps to regulate atmospheric CO2 and thus maintain the balance of our global climate.[204,205,206] In addition to the burial of carbon in deep sea sediments, the ocean's biodiversity is critical to carbon sequestration. Large organisms like whales sequester tonnes of carbon over their lifetime, but microscopic underwater organisms are also outsized carbon sequestration actors. In one study, researchers estimated that up to 10% of the CO2 removed from the atmosphere by the ocean each year may be absorbed by a species of benthic bacteria discovered in the deep sea; this bacteria may also provide a food source to other deep sea organisms, elucidating a much more complex food chain in the deep sea than was previously thought.[207] The researchers behind this study worry that the DSM activities planned for the CCZ could significantly disturb this delicate environment, with devastating consequences for the ocean's key climate change mitigation role.[208]

Ironically, the reason DSM is a growing industry is also due to climate change. To reduce greenhouse gas emissions, governments and businesses are investing in renewable energy technologies like wind turbines, solar panels, batteries and electric vehicles which are built with materials like lithium, cobalt and nickel targeted by miners. Some researchers predict that by 2050, demand for rare minerals could increase up to 20 times current levels to meet the demand for new electric vehicles alone.[209]

The environmental threats of deep sea mining

To extract mineral resources out from the deep sea, companies are looking to scrape, dredge and cut out rare minerals and pump them up to specialised processing ships. Long pipes are installed to transfer slurries full of minerals back to the water's surface, with water and sediments filtered out and dumped back to the ocean. All these activities would pose excessive stress on undisturbed deep sea ecosystems.

Life moves incredibly slowly in the deep sea. Studies of the CCZ seabed have estimated that sediment accumulates at a rate of 0.3–15 mm every thousand years.[210] Organisms have evolved to fit this slow pace: deep sea ecosystems are incredibly sensitive to large-scale disturbances or changes in the environment.[211] With such a slow rate of growth, areas disturbed by deep-sea mining would be unlikely to recover on a reasonable timescale. One of the only large-scale experiments with deep sea mining technology, the DISCOL experiment conducted in 1989 in the CCZ illustrates this disturbing fact: a follow up visit to the impacted area in 2015 showed that the ecosystem had still not recovered its microbial biodiversity or carbon cycling 26 years on.[212,213]

Climate change driven impacts such as warming, oxygen depletion and ocean acidification are also likely to further detract from the ability of deep sea ecosystems to recover from the impacts of DSM.[214] Lastly, DSM could potentially release enormous amounts of organic carbon currently stored in deep sea sediments, which may impact the carbon cycle.[215]

Furthermore, research indicates that mining on the deep sea floor may also have a significant impact on organisms closer to the surface. The sediment plumes and noise pollution of deep sea mining, as well as the potential for contaminating the water column with toxic metals, may have a disastrous ecological impact on the biodiversity of the ocean midwaters[216] – ecosystems which contain fish biomass 100 times greater than the global annual fish catch,[217] connects deep sea and coastal ecosystems, and are key in the ocean's capacity to sequester carbon.[218] Ecological baseline studies for midwater ecosystems likely to be impacted by deep sea mining do not currently exist.[219]

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, and protect communities from the socioeconomic impacts caused by the degradation of deep sea ecosystems. There currently are no solid baseline studies evaluating the full carbon cycle impacts, including emissions, of the DSM industry.[220]

Deep sea mining and the perpetuation of global injustices

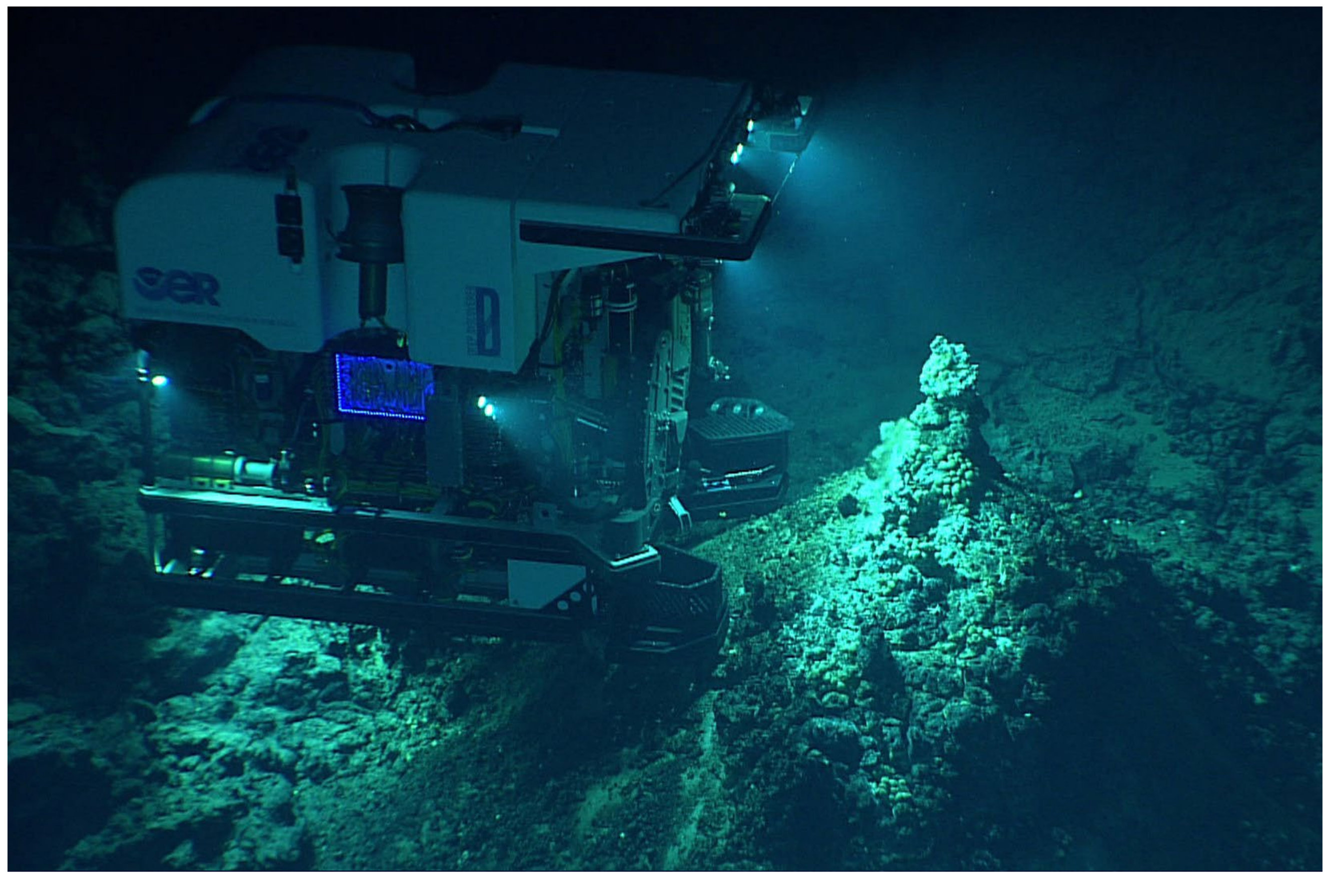
While the minerals mined from DSM seem beneficial to humanity in fighting climate change, the impacts of this extractive industry raise further issues of environmental injustice. In Papua New Guinea (PNG), the first ever commercial DSM project, operated by a Canadian company Nautilus Minerals in PNG's EEZ, demonstrates the injustices.

The Nautilus Minerals project Solwara I was slated to occur 30km from the Duke of York archipelago, where communities have a deep spiritual connection to the ocean and the seabed, and whose diets and livelihoods depend on fisheries which would be devastated by the environmental disturbance and noise pollution of the planned deep sea mining activities.[221] Local communities in PNG, together with other Pacific communities affected by DSM, formed the Alliance of Solwara Warriors and have been campaigning against the mining project since 2009 and further filed a legal case against it in 2017. Solwara I has ended up facing financial difficulties and seems unlikely to move forward, but for the Pacific islands, this is just a temporary reprieve from the threats posed by DSM.[222]

The Alliance of Solwara Warriors and other civil society organisations are mobilising against deep sea mining projects which threaten the human rights, livelihoods, and cultural heritage of local coastal communities. Source: CIVICUS

EJF recommendations on deep sea mining

Better and more extensive scientific knowledge of the deep sea is urgently needed to understand deep sea ecosystems and their blue carbon value. All mining activities should be prohibited until the environmental impacts of DSM are fully understood and comprehensive risk mitigation strategies are able to prevent any long term harm to ocean ecosystems. Therefore, EJF supports the call for the 10 year moratorium initiated by the Pacific island state governments.[223] However EJF is advocating for a broader moratorium which is not time bound, but which is linked to the ability to effectively protect deep sea ecosystems: until such a time as we can definitively prevent environmental harm in the deep sea, no commercial DSM must be allowed in either national or international waters. EJF further calls for international funding for comprehensive baseline studies of the deep sea ecosystem by independent researchers. Lastly, to fulfil the needs for rare minerals without risking our environment and human rights, governments must prioritise truly sustainable solutions over DSM. Governments must scale up investment for the design and implementation of the innovative technologies and circular economic models for large scale electronics recycling programmes for the reuse of minerals needed for renewable energy technologies.



Exploration of a deepwater hydrothermal vent.
Picture credit: NOAA Office of Ocean Exploration and Research

Call to 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 EU 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.

EJF calls on EU leaders to:

- Commit to the 30x30 ocean protection plan and designate at least 30% of the high seas as ecologically representative fully or highly protected marine protected areas by 2030. EU Member States must further commit to protecting 30% of national and coastal waters, and to providing the resources necessary to fully protect designated MPAs.

- Integrate blue carbon and the climate control function of the ocean into the EU's updated NDC commitments, including by addressing ocean conservation issues throughout the "Fit for 55" legislative package.

- Pass a rigorous EU Biodiversity Strategy to 2030 which sets ambitious, legally-binding nature restoration targets, and take a leadership role at the upcoming (2021) Convention on Biological Diversity COP to encourage nations to set binding, measurable biodiversity restoration and conservation targets and to leverage technical and financial support for developing nations to meet such targets. The EU must also support the prompt development of a strong, legally binding Biodiversity Beyond National Jurisdiction (BBNJ) Treaty that provides regulations targeting the protection of marine ecosystems.

- Include ocean protection standards in the forthcoming EU Sustainable Corporate Governance legislation in order to ensure that companies operating in the EU single market conduct adequate due diligence in their value chains and that no products sold in the EU are contributing to the destruction or degradation of ocean ecosystems.

- Provide support and funding for climate finance mechanisms that recognise the responsibility of historic greenhouse gas emitters to support community-led blue carbon restoration, nature-based solutions and ecosystem-based adaptation in developing countries.

- All climate and marine policies must be based on the latest available scientific evidence, and the precautionary principle must be applied in all ocean policy, especially where robust scientific evidence may be lacking. The EU must advocate for a deep sea mining moratorium in international and national waters, and push for governance reform and stronger oversight of the deep sea mining industry.

- Adopt and implement EJF's 'Ten principles for global transparency in the fishing industry'.

- Ban destructive fishing practices such as dredging or bottom trawling in MPAs, and phase out harmful subsidies for the fishing industry.

Picture credit: Gaby Barathieu / Ocean Image Bank

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The health of the ocean is not only important to our planet, it is also directly linked to more equitable societies and economies, especially for coastal communities. Currently, over three billion people depend on marine and coastal biodiversity for their livelihoods, of which 680 million live in low-lying coastal zones.

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