



Why Oceans and Marine Biodiversity Matter as Investment Issues

'Earthrise', described as the "most influential environmental photograph ever taken"¹, was snapped by astronaut William Anders on the 1968 Apollo 8 mission. The picture was striking because it showed that Earth is, in fact, blue: a blue planet. The ocean covers 70% of the planet's surface, holding 97% of all water and 80% of the world's biodiversity². The ocean is critical to life on earth as we know it and plays a vital role in regulating the climate.

The ocean provides over 50% of the oxygen we breathe, absorbing 30% of the CO₂ produced by humans and 90% of the heat generated from these emissions. It is sobering to know that if the ocean didn't absorb this heat, the surface temperature on Earth would be around 35°C higher than it is today – and we're worrying about breaching 1.5°C!

The ocean economy

A healthy ocean is a powerful economic engine supporting many sectors. The ocean or 'blue economy' comprises economic activities including marine renewable energy, shipping & ports, tourism, fishing, aquaculture, pollution & water management, shipbuilding & refit, blue biotechnology, blue technology and ocean observation. The annual economic value of the blue economy is estimated at \$2.5 trillion³, ranking oceans as the equivalent of the seventh-largest economy by GDP, with ocean assets conservatively estimated at \$24 trillion.

A sustainable and growing blue economy can provide investment opportunities and a significant environmental return. For example, mangroves and coastal wetland can store 3–5 times more carbon than an equivalent-sized tropical rainforest.⁴ It's been estimated that a cost of \$2 trillion can deliver over \$10 trillion in a host of economic, environmental and health benefits.⁵

The Office for National Statistics values the UK's marine natural capital assets at £211bn.⁶ This doesn't capture all the valuable services that the marine environment provides, such as coastal protection, which is estimated to be worth between £3.1 and £33.2 billion per year to the UK economy. The growing interest from business and institutional investors in sustainability and sustainable finance must not leave the ocean and marine biodiversity behind.

Threats to ocean health

The health of the ocean is, however, under severe threat. The three biggest pressures come from pollution, the overexploitation of marine biodiversity and climate change. These key issues are leaving industries, businesses and people's livelihoods – the whole of the blue economy – at risk.



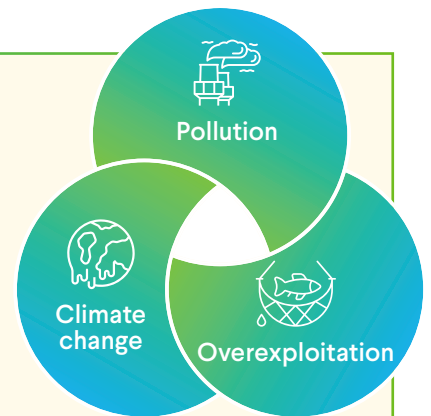
Pollution is an increasing threat, particularly from plastics and microplastics including synthetic microfibres from textiles. It's estimated that in the UK, in one week alone, 9 trillion fibres find their way into the environment.⁷ Their prevalence causes chemical pollution, as does untreated sewage being discharged into waterways and directly into the sea. It's estimated that over 80% of marine pollution is due to land-based business activities.⁸



Fishing has had the biggest impact on marine biodiversity, with unsustainable, unmonitored, and often illegal practices over-exploiting fisheries. Marine biodiversity plays a critical role in carbon sequestration, with seagrasses and mangroves providing more efficient carbon storage than their terrestrial-based equivalents. However, according to the UN's second World Ocean Assessment,⁹ published in 2021, 90% of mangrove, seagrass and marsh plant species are threatened by extinction.



Climate change and a warming planet are causing rises in surface sea temperatures, ocean acidification and deoxygenation, with potentially devastating impacts on marine life and weather patterns.



One way to limit the threat to ocean health is through the establishment of **Marine Protected Areas**, which aim to protect marine biodiversity from the harm caused by human activities.

Considering its vastness, it's remarkable that only a mere 13% of the world's ocean remains classified as wilderness, still untouched by the negative impacts

of human activity.¹⁰ However, SDG 14, Life Below Water, remains the least funded UN sustainable development goal. Awareness of the role and importance of the oceans in combating the climate and biodiversity crises remains stubbornly low in the global investment industry.



KEY THEME 1: MARINE POLLUTION

Pollution is one of the key pressures on the oceans, threatening 37% of marine mammals with extinction.¹¹ Marine pollution has multiple sources, from tiny fibres shed by clothes to chemicals washed down the sink. Pollutants – including plastics, chemicals and bacteria – travel from towns and cities to the sea as well as directly arising from ocean activities.

Plastic pollution, from large items such as fishing gear to the microscopic particles resulting from physical and chemical breakdown, has emerged as a major environmental issue affecting the world's oceans. Plastic particles may directly impact marine animals by ingestion, as they're mistaken for food particles, which can lead to choking of the digestive system, but also by entanglement leading to injury or drowning.

Significantly, sewage treatment plants are not capable of eliminating substantial inputs of microplastic pollution into freshwater and marine water bodies.¹² With water utilities increasingly held by institutional investors, this is a key area where asset owners should understand their exposure and engage with portfolio companies to encourage sustainable practices.



Microplastics – microfibres

Microplastic pollution caused by washing processes of synthetic textiles has recently been assessed as the main source of primary microplastics in the ocean.¹³ It's estimated that 11 million tonnes of plastic enter the ocean every year,¹⁴ with nearly a million tonnes of this going into the sea as 'primary microplastics', meaning they're already less than 5mm in size.

Microplastics can accumulate in the gills, liver and gastrointestinal tract of aquatic organisms, such as fish and shellfish. In all cases, studies showed inflammatory responses, metabolic disturbances, cellular damage and toxicity to specific organs.¹⁵

These microplastics may be from products we use every day, such as textile fibres, and it's estimated that 35% of primary microplastics come from domestic and industrial washing cycles. The release of synthetic fibres from polyester, polyester-cotton blend and acrylic fabrics into wastewater during each use of a washing machine could be as high as 700,000¹⁶ microfibres, the equivalent of 9 trillion fibres released per week into the environment in the UK alone.

Filter technology, which can remove up to 80% of microfibres shed in a typical washing cycle, is only used by a few washing machine manufacturers today. This provides an engagement opportunity for asset owners to mitigate this pervasive form of marine pollution by encouraging the widespread adoption of microplastic filter technology.¹⁷

Chemicals

Chemical pollution is a grave threat to biodiversity in the marine environment, particularly from a category of chemicals known as PFAS (per- and polyfluoroalkyl substances), a highly persistent group of several thousand chemicals. PFAS can give items both waterproof and greaseproof properties and withstand a lot of heat. They're also very unreactive, so they don't break down in the environment, hence their nickname: 'forever chemicals'.

PFAS are able to move in water very easily. They've been found in rivers, seawater (including the polar regions) and drinking water, as treatment plants are currently unable to effectively remove them. In the marine environment, PFAS have been shown to impact bottlenose dolphins in the US, where links were shown between increased levels of PFAS and effects on immune, blood, kidney and liver function.¹⁸

PFAS exposure has also been linked to impacts on the immune function of sea otters, neurological impacts in polar bears and negative effects on fish and seabirds.

Additionally, the UK's orca population, which hasn't reproduced in several years, may go extinct as a result of severe polychlorinated biphenyl (PCB) pollution. PCBs, another man-made chemical, were banned globally in 2001 due to their highly carcinogenic nature and, similarly to PFAS, are almost impossible to remove once in the environment.

A simple test for PFAS in packaging is, using a homemade dropper, drop a small amount of olive oil onto the packaging. Does the droplet soak in or spread out, or form a perfect little bead? If it forms a bead, it has PFAS chemicals in it.

A number of non-governmental organisations are proposing that PFAS be banned because of their persistence and impact on marine biodiversity. Asset owners can also play an active role in the reduction of PFAS and PCB chemicals through engagement with key companies involved in the production and dissemination of these 'forever chemicals' in the marine environment.





Sewage discharging into the environment has become an issue of great public interest in the UK. Raw sewage contains a cocktail of bacteria, viruses, harmful chemicals and microplastics. Many of the UK's sewer pipes collect both rainwater and sewage (called combined sewers). Safety valves, called combined sewer overflows (or just storm overflows) were built into them to stop flooding during periods of very heavy rainfall. These storm overflows allow untreated sewage to spill into rivers, estuaries and directly into the sea.

In 2021, 1,651 storm overflows within 1km of a Marine Protected Area in England spilt untreated sewage for a total of 263,654 hours – the equivalent to over 30 years – across England.¹⁹

These protected areas are home to vital habitats including seagrass and chalk reefs, as well as a diverse array of marine life. UK government data shows that only 19% of estuaries and 45% of coastal waters are at 'Good Ecological Status', with none meeting 'Good Chemical Status', and three quarters (75%) of shellfish waters failing to meet water quality standards.²⁰ This has an impact on local economies, discouraging tourism.

Sewage also puts the long-term viability of carbon efficient seagrass at risk. Seagrass is one of the most effective natural carbon storage systems, accounting for an estimated 10–18% of ocean carbon storage while occupying only 0.1% of the seafloor. Unlike terrestrial habitats like forests, seagrass doesn't release the carbon it has captured back into the atmosphere when it decomposes. If undisturbed, seagrass can store carbon for thousands of years.

Nutrients and pathogens in sewage, however, cause over-enrichment in the water, resulting in the suffocation of seagrass as these nutrients cause faster-growing microscopic algae to smother the seagrass leaves, decreasing their ability to capture light and ultimately killing them. This destroys their carbon storage capability as well as a vital habitat for fish and other marine animals.

Asset owners can play an important role in reducing sewage discharge by encouraging long-term investment in sewage infrastructure by the water industry, coupled with active engagement with water companies to halt harmful sewage practices.



KEY THEME 2: OVEREXPLOITATION

Overfishing is the removal of a species of fish at a rate where the population cannot be replenished and recover naturally. Overfishing often goes hand in hand with wasteful commercial fishing – known as bycatch – that hauls in large quantities of unwanted fish and other sea life. Over 40% of fish catch worldwide is unintentionally caught and thrown back into the sea.²¹ Bycatch causes the needless loss of billions of fish and hundreds of thousands of sea turtles, cetaceans and seabirds.

Around 3 billion people rely on fishing as a source of food and it's estimated that over 600 million livelihoods worldwide depend on fishing and aquaculture (the cultivation of aquatic organisms).²² The global seafood market reached a value of over \$330 billion in 2022 and is projected to reach to about \$730 billion by 2030.²³ This is an important sector for business and finance, particularly in coastal areas.

However, one third of the world's assessed fish populations are currently pushed beyond their biological limits.²⁴ Harmful subsidies are a key driver of overfishing and many fishing limits are unsustainable, with illegal fishing further depleting populations. Overfishing also has a knock-on impact on other species, such as predators of fish, which further harms marine biodiversity.



2048

Date we might **run out of seafood** for normal consumption based on projected depletion rates



34%

Proportion of ocean's fish stocks that are **currently overfished**



93 million tons

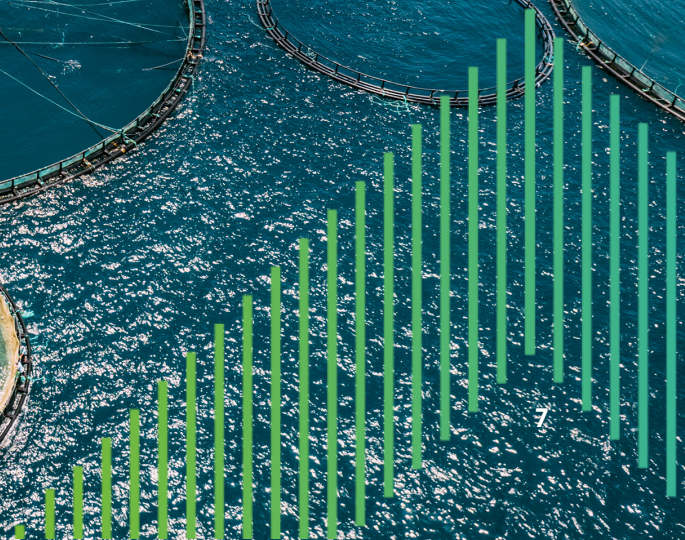
Weight of fish caught each year. **Over 40%** of these are bycatch

Overexploitation and degradation of marine environments goes beyond fishing. A 2021 study²⁵ found that bottom trawling – a widespread fishing practice – releases as much carbon dioxide every year as the entire aviation industry. Other activities such as deep-sea mining and oil extraction further degrade water quality, destroy habitats, contaminate seafood and wipe out marine species.

Partial solutions exist, and the transition to the sustainable use of marine resources offers potential opportunities for investors. Sustainable seafood practices and alternative food sources are required, as well as technical innovation to reduce bycatch. We're seeing a growing trend towards aquaculture – the breeding, raising, and harvesting of fish, shellfish and aquatic plants. To relieve the strain on the ocean, 47% of our seafood demand is now farmed fish.²⁶ However, this can cause problems of its own, as it requires significant fishing of smaller wild fish to feed carnivorous fish within aquacultures.

Aquaculture is likely to expand significantly to satisfy the growing demand for aquatic foods while generating new sources of income and employment. Investment and innovation in this space could be key to meeting the global demands of a growing population in a sustainable way.

Effective fishing management and sufficient data to ensure that all fisheries keep fish stocks at sustainable levels are also important areas of focus. Asset owners can encourage investee companies to better understand their value chains and reduce any sources of waste. Finally, increasing the number and scale of Marine Protection Areas and no-take zones is essential to help preserve ocean habitats and give marine populations a chance to recover.



KEY THEME 3: CLIMATE CHANGE

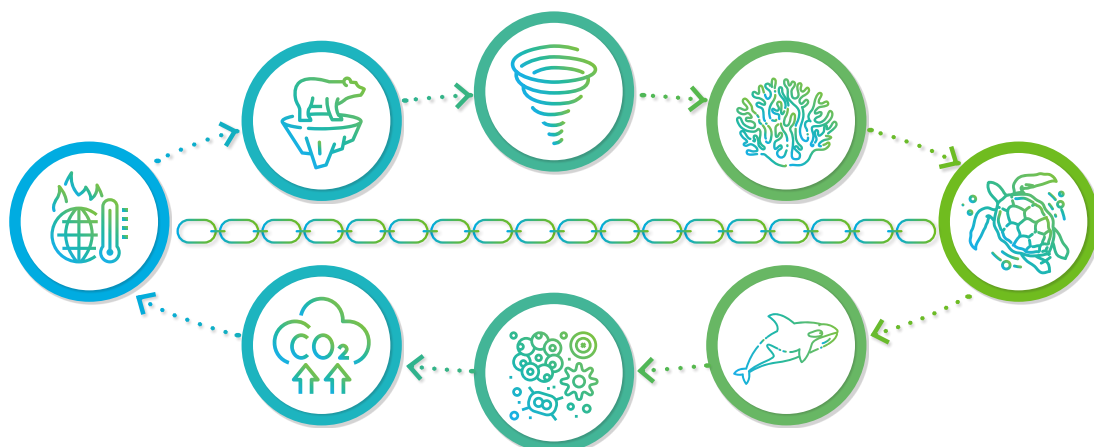
Marine biodiversity and climate change are intrinsically linked. We cannot solve the problems arising from global warming without addressing those relating to marine biodiversity loss, and vice versa.

Climate change is causing the ocean's temperature to rise. Warmer waters make hurricanes, cyclones and other weather perturbations more frequent, with devastating consequences for coastal ecosystems and populations. Global warming, together with ocean acidity and pollution, is also causing irreparable damage to coral reefs, which are essential in regulating the carbon dioxide in the atmosphere.

Already, more than half of living corals have died since the 1950s, with 70–90% of all coral reefs expected to disappear in the next 20 years.²⁷ More generally, ocean warming directly affects marine life by disrupting the functioning of food webs. Climate change could lead to a 20% reduction in the global abundance of marine life by 2100.²⁸

Conversely, the ocean absorbs 30% of all human carbon dioxide emissions and captures 90% of the excess heat generated by these emissions. As well as stabilising the Earth's climate, the ocean plays a pivotal role for oxygen generation. Dolphins and whales fertilise microscopic marine organisms called phytoplankton, which are the base of several aquatic food webs. These absorb four times more carbon dioxide than the Amazon rainforest and generate over half of the world's oxygen.²⁹

The reduction in the number of whales and dolphins (caused by plastic pollution, chemical pollutants, destructive fishing practices and hunting) sets off a chain of events that not only risks the loss of species and ecosystems but affects the delicate balance of oxygen and carbon dioxide necessary to sustain life on earth.³⁰



KEY THEME 4: MARINE PROTECTED AREAS

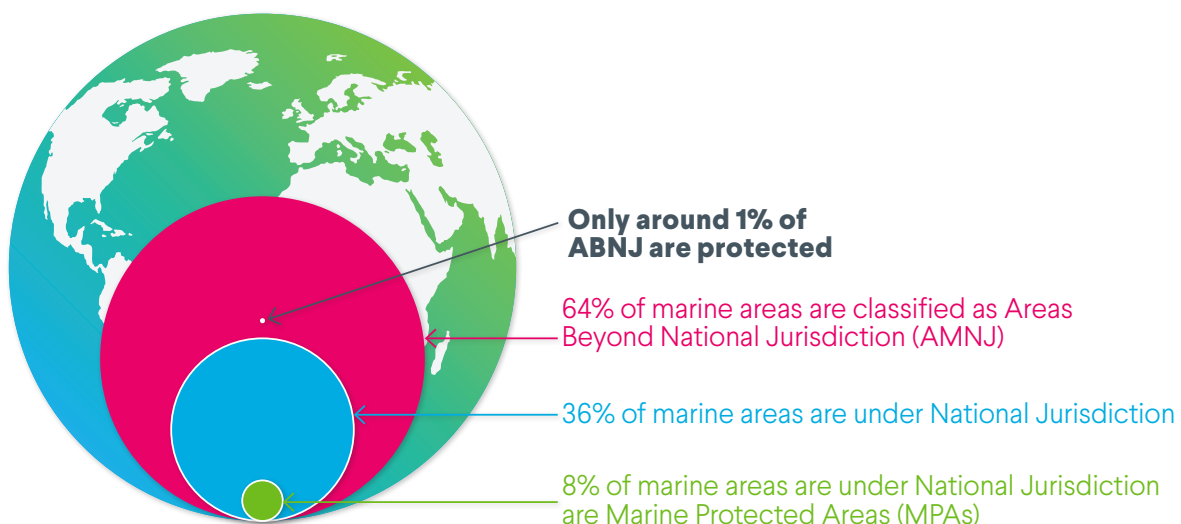
Marine Protected Areas (MPAs) are clearly defined areas of the ocean that are managed to achieve long-term nature conservation. These aim to protect habitats and species from the damage caused by human activities; however, global coverage of MPAs is only 8.2% of the ocean.³¹

The ocean is divided into National Waters and Areas Beyond National Jurisdiction (ABNJ), in international waters (see the figure 1). The UN Convention on the Law of the Sea,³² which is the overarching international legal framework for the ocean, includes obligations to protect and preserve the marine environment and to conserve marine resources, but doesn't specify mechanisms for conserving marine biodiversity in ABNJ (which instead rely on Regional Seas Conventions³²). Many countries have set protection

targets for national marine areas, with specific action plans for implementation, but only 2 countries (Palau and the UK) currently have designated over 30% of their waters as MPAs.

In practice, MPAs include a range of protection types, with a smaller proportion of these areas classed as fully protected zones (see figure 2). Currently only around 0.01% of the ocean is classified as a no-take zone, where fishing, mining, and other extractive activities are completely prohibited.³⁴

Figure 1: Proportion of marine areas which are protected

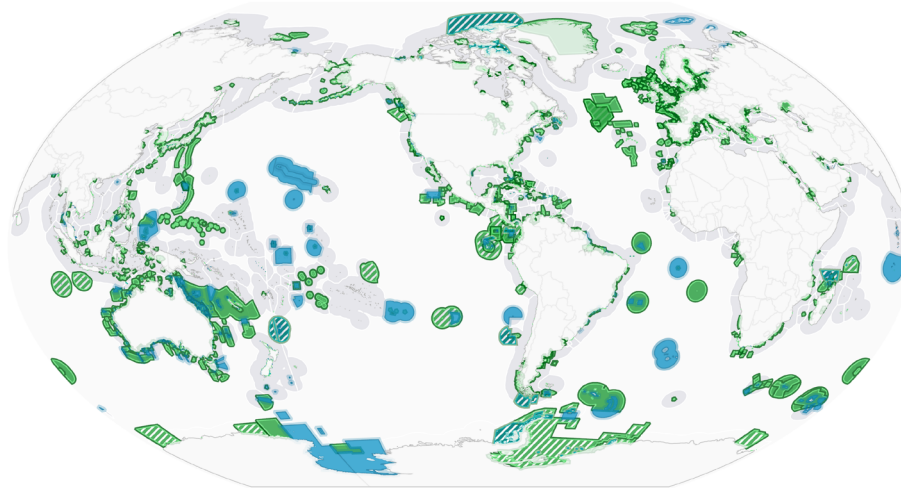


Marine regulation is very difficult to enforce, given the expansive size of the world's ocean. Nearly two-thirds of the world's ocean is beyond national jurisdiction, where no single state has authority (these are the dark blue areas in figure 3).

However, there's recently been progress in this area. The High Seas Treaty, a formal agreement on protecting marine biodiversity in ABNJ, was signed by over 80 countries in New York on 20 September 2023. The treaty addresses the significant gap in ocean protection outside of National Waters and is a first step towards increasing the 1% proportion of the high seas that is currently protected.

Investors can play an important role in providing capital to close the \$100bn per year funding gap³⁵ for MPAs and can help reduce conservation inefficiencies within MPAs. An increase in ocean protection has many benefits: protecting marine biodiversity, sustainable food provision and carbon storage from the marine environment. There's still a lot of work required to achieve the 30x30 target from the COP15 biodiversity conference in December 2022³⁶ to protect and restore at least 30% of the marine environment by 2030.

Figure 2: Global Marine Protected Areas as of November 2022

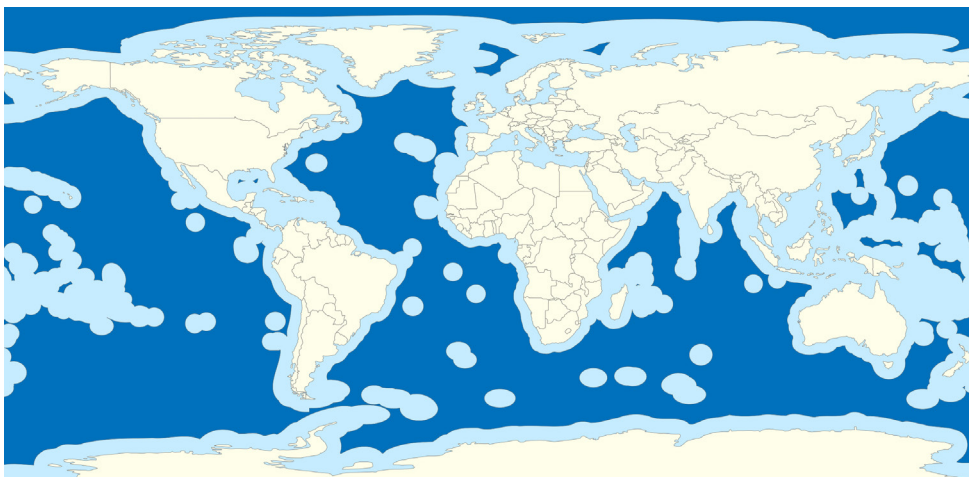


Marine Protected Areas
 Level of Protection
 ■ Highly-Fully Protected Zones
 ■ Less Protected Zones / Unknown
 ▨ Pending Implementation / Proposed



Source: Russell Moffitt for the Marine Protection Atlas at Marine Conservation Institute

Figure 3: Map of exclusive economic zones



Source: Wikipedia Commons

Case study: blue bonds

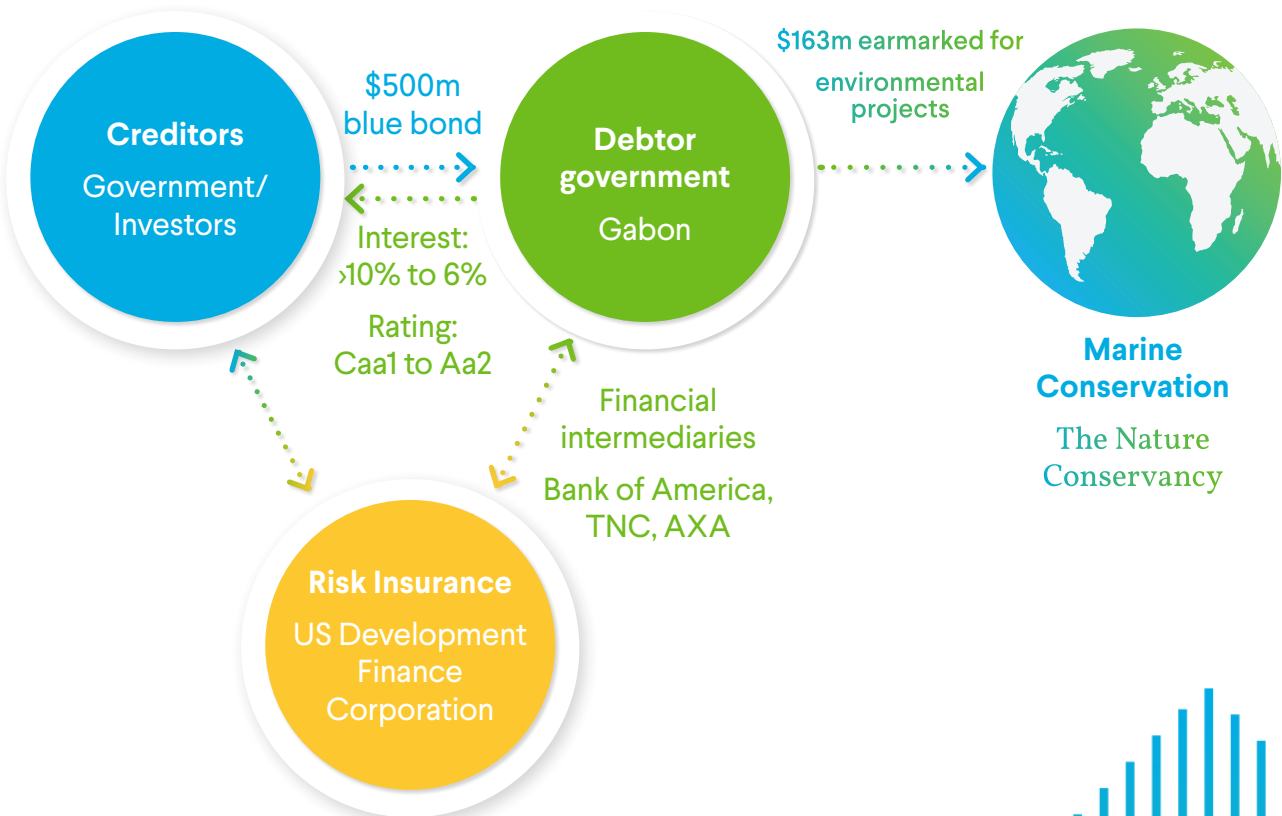
Debt-for-nature swaps allow governments to reduce the cost of their debt and reallocate (some of) the savings to protect and restore nature. In particular, blue bonds aim to protect marine biodiversity and increase nature-based resilience against climate change by channelling investor capital into sustainable ocean-focused projects. These are an interesting example of how the public and private sectors can work together to support MPAs and reduce the sustainability financing gap.

Recent deals in Belize, Barbados, the Seychelles, Ecuador and Gabon have shown how this can work in practice, with over \$800m of expected conservation funding from these projects alone. Their structure is complex and involves a number of parties. We've illustrated the 2023 Gabon deal below .

Gabon refinanced \$500 million of its debt into a new blue bond with a higher credit rating and lower interest rate, in a transaction supported by the US Development Finance Corporation. This is expected to generate \$163 million for marine conservation projects overseen by The Nature Conservancy (an environmental non-profit organisation). These include a pledge to protect 30% of the country's coastal waters, setting up new MPAs and spending \$5 million a year to tackle illegal fishing. We've illustrated the 2023 Gabon deal below (see figure 4).

These structures aren't a silver bullet for marine conservation, but they offer the potential for investors to earn a strong risk-adjusted return while supporting the restoration of crucial marine habitats.

Figure 4: Gabon blue bond structure



Actions for investors

The ocean and marine biodiversity matter for investors. We've highlighted four key areas of focus for investors looking to protect marine biodiversity: **1. pollution**; **2. overexploitation**; **3. climate change**; and **4. marine protected areas**.

Taking a step back, what actions can asset owners take to make a positive difference and tackle the marine biodiversity crisis?

Education and engagement

- Understand the importance of the ocean and marine biodiversity, including how to tackle each key theme: pollution, overexploitation, climate change and marine protected areas
- Raise awareness of these key issues and how investment choices can lead to positive change
- Engage with investment managers and portfolio companies on marine biodiversity to limit harmful impacts and understand portfolio dependencies on the ocean
- Use voting power, where possible, to encourage conservation and sustainable business practices

Risk management

- Use biodiversity data/metrics to understand the impacts and dependencies of asset portfolios on marine biodiversity (by following the TNFD's guidance and LEAP framework³⁷)
- Implement negative screening processes that exclude companies involved in harmful activities such as overfishing, destructive exploitation practices or pollution
- Prioritise investments in companies that emphasise transparency and traceability in their supply chains to ensure sustainable sourcing

Collaboration and policy

- Collaborate with other parties (investors, NGOs and academia) to improve the understanding of key issues and join initiatives to protect the marine environment, including the enforcement of designated MPAs
- Work with others to encourage policymakers to protect marine biodiversity by removing harmful subsidies and addressing key drivers of loss such as pollution and overfishing

Opportunities and innovation

- Actively seek out and invest in companies that prioritise marine conservation
- Support and invest in companies that follow sustainable fishing practices, such as those certified by the Marine Stewardship Council³⁸
- Promote innovation, including opportunities to invest in technologies to reduce the environmental impact of marine-related industries (eg sustainable aquacultures, plastic capture, pollution reduction, marine carbon capture)
- Consider investment funds and strategies that explicitly aim to have a positive impact on the marine environment (eg blue bonds or new marine technology)

Please [get in touch](#) if you'd like to discuss how to address marine biodiversity issues in your asset portfolio.

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André Ranchin,
Investment Consultant and
Biodiversity Lead – Hymans
Robertson
andre.ranchin@hymans.co.uk



Will Oulton
Chair – European Sustainable
Investment Forum
Non-Executive Trustee Director –
Marine Conservation Society
will@oulton-esg.com

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