



RESPONSIBLE FINANCE FOR BLUE CARBON ECOSYSTEMS

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This document has been prepared to clarify the approach and position of WWF on advancing sustainable blue carbon financing opportunities. This includes financing specific to the production and accounting of emissions reductions (e.g. climate mitigation finance), as well as other innovative and emerging techniques to support the long-term sustainability of blue carbon habitats. This document supplements WWF guidance on climate mitigation and carbon markets in our report Beyond Carbon Credits: A Blueprint for High-Quality Interventions That Work for People, Nature, and Climate, as well as subsequent WWF nature-based solutions guidance.

WWF

WWF is an independent conservation organisation, with more than 35 million followers and a global network active through local leadership in over 100 countries. WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which people live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

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EXECUTIVE SUMMARY

Maintaining and restoring the health of carbon-rich coastal and marine ecosystems (“blue carbon” ecosystems) is essential for bolstering climate resilience, facilitating adaptation, conserving biodiversity, contributing to climate mitigation, and supporting sustainable coastal livelihoods. Securing the future of these habitats and seascapes requires coordinated, collective action from a wide range of stakeholders. To date, however, financing for the protection, restoration and effective management of these ecosystems has been limited and has failed to reach the scale needed for them to contribute effectively to global climate mitigation and adaptation efforts.

WWF recommends a “contribution approach,” where corporations and other entities that are implementing science-based emissions reduction targets also contribute to financing climate solutions based on a carbon price far above that generally practised in the voluntary carbon market, and

without making carbon neutrality claims prior to achieving net-zero emissions through their science-based targets. Acknowledging the specific need to advance action for carbon-rich coastal and marine habitats, blue carbon financing should also deliver a range of actions and measures, including to:



Finance blue carbon science



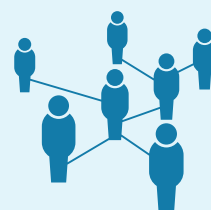
Build knowledge and capacity



Incorporate blue carbon into long-term national blue economy strategies



Focus on generating and measuring co-benefits



Build an ample pipeline of investible and scalable community-based projects and enterprises

The increasing interest in blue carbon provides substantial opportunities in terms of policy development, finance, and protection, restoration and sustainable management on the ground. It also incentivizes governments to inventory and account for blue carbon habitats, alongside their commitments under the Global Biodiversity Framework. Blue carbon financing, while still small, is increasingly being made

available through new finance tools and approaches, but a host of issues – from regulation to science to community rights and engagement – mean there is still work to be done to create a sound framework. It is clear that a holistic approach is needed to accelerate blue financing opportunities that integrate adaptation, resilience, biodiversity conservation and sustainable community livelihoods.

INTRODUCTION

Blue carbon habitats provide essential ecosystem services for humanity, including both to mitigate climate change and to adapt to it. The protection, restoration and stewardship of these habitats are critically important nature-based solutions (NbS) that can deliver positive outcomes for people, nature and climate.

The world is waking up to the ocean's critical role in climate mitigation, adaptation and resilience building – from the carbon sequestered in blue carbon habitats to the protection that ecosystems like coral reefs provide against storm surges and other climate change impacts. But only a healthy ocean can provide these essential services. By investing in the recovery and protection of our ocean's ecosystems and biodiversity, and by better managing its precious resources, we can rebuild the resilience of the ocean, supporting the communities that depend upon it and improving our ability to respond to climate change.

“Blue carbon” typically refers to carbon captured within coastal and marine ecosystems, such as mangroves, saltmarshes and seagrasses, as well as macroalgae (such as kelp) and marine sediments. Vegetated blue carbon habitats can sequester three to five times more carbon per unit area than tropical forests (Donato, 2011), and support adaptation through flood and storm protection, water filtration, soil fertilization, food provisioning and more.

But despite their environmental and social importance, blue carbon habitats are under severe pressure from a range of degradation drivers, including agriculture, aquaculture, infrastructure, and urban development. Government interventions and policy measures to protect these carbon-rich coastal ecosystems are needed to combat the direct and indirect drivers of habitat loss.

In addition, policy conditions must enable community-based management and governance, as well as other measures, to incentivize action and to ensure benefits are shared equitably. Substantial increases in finance for targeted blue carbon habitat protection and restoration measures are also needed to support the implementation of these policy measures, incentivize action by landholders, local communities and other stakeholders, fund conservation action in the field, and address the social and economic costs associated with conservation and restoration measures. WWF is committed to supporting investments in high-quality nature-based solutions (NbS), including for blue carbon

protection, restoration, and effective management – and to ensure this is done in a manner that will benefit climate, nature and people.

In 2020, WWF published a landmark paper: *Beyond Science-Based Targets: A Blueprint for Corporate Action on Climate and Nature*. This introduced the Corporate Climate Mitigation Blueprint, which focuses on the actions that can underpin a truly effective corporate strategy for mitigating the effects of climate change and protecting nature. The blueprint is framed in the context of broader corporate climate efforts, which should prioritize emissions reductions, and highlights three additional elements that must be addressed in parallel with investment in mitigation: advocating for climate policies such as carbon pricing and sector-specific incentives; collaborating with peers to achieve lasting climate progress; and improving company and ecosystem resilience in the face of global warming.

A year later, WWF released a companion paper called *Beyond Carbon Credits: A Blueprint for High Quality Interventions that Work for People, Nature and Climate*. In it, WWF explored the concept of NbS from an investment and carbon market perspective, and argued that all related investment measures must deliver “real, meaningful and measurable benefits for people, nature and the climate, and do so increasingly at sub-national to national scales, as envisioned in the Paris Agreement.” It also emphasized the need to address the drivers of nature loss. Importantly, this paper stated that “many of the same considerations” it develops for forests can also be applied to other ecosystems, including in the marine environment. Following this, WWF published a discussion paper which proposed a set of 12 closely interrelated principles, organized by four values, that constitute the highest integrity for benefit sharing in forest NbS.

This paper explores the relevance and applicability of these approaches to blue carbon ecosystems, and seeks to clarify WWF's position and recommendations for advancing sustainable blue carbon investment and financing opportunities.

BACKGROUND – BLUE CARBON ECOSYSTEMS

Historically neglected, blue carbon ecosystems are now coming to international attention, but policy frameworks for their protection and restoration are still largely in their infancy.



BLUE CARBON ECOSYSTEMS

Blue carbon ecosystems are highly efficient carbon sinks. Their annual contribution from carbon storage and sequestration has been valued financially at >US\$190 billion (Bertram et al., 2021), which is significantly higher than terrestrial systems per unit area. Blue carbon ecosystems are also of immense importance for biodiversity, communities, and the national economies of coastal states. Seagrass beds, for instance, cover only 0.1% of the ocean floor but provide valuable nursery habitat to about 20% of the world's largest fisheries, while storing up to 18% of the world's oceanic carbon (UNEP, 2022; Reynolds, 2018). Blue carbon seascapes – zones that include fully submerged marine habitats (like seagrass beds) and semi-submerged coastal habitats that link land and oceans (like mangroves) – also protect against rising seas and increasingly extreme coastal weather events, and provide a range of other critical ecosystem services, underpinning coastal community livelihoods and food security. Indeed, mangroves alone are estimated to reduce the costs associated with impacts such as flooding by over US\$65 billion annually (Leal, 2022).

Despite their environmental and social importance, blue carbon ecosystems are under severe pressure from a range of degradation drivers, which led to more than 50% of the world's natural saltmarshes being lost during the 20th century (Barbier et al., 2008; Duarte et al., 2009; Xin et al., 2022). For mangroves, as much as 35% of historical cover had been lost by the 1980s and 1990s (Friess et al., 2019). Global seagrass data remain incomplete, but researchers have estimated that some 25% of seagrass area has been lost compared to the historical baseline (Waycott et al., 2009).

While mangroves, saltmarshes and seagrass are currently seen as the most actionable areas for blue carbon storage, other coastal and marine ecosystems also hold important potential. Macroalgae (i.e. seaweed) farming is well established in some regions and rapidly developing in others, offering both enterprise and carbon storage opportunities. The contribution of wild seaweeds, such as kelp forests, to blue carbon stores has also become increasingly apparent,

although there are questions about the carbon dynamics (i.e. flows and storage of detritus) and long-term storage potential of these systems (Duarte, 2017). Similarly, potential sinks such as mudflats and seafloor sediments as well as phytoplankton offer potential greenhouse gas (GHG) removal mechanisms, but these would require scientific advances to account for and manage accordingly.

The blue carbon financing methods presented here are largely applicable to established blue carbon ecosystems, including mangroves, saltmarshes, seagrasses, and to some degree seaweeds, as well as enterprise opportunities located within or sustainably utilizing these resources. However, it is possible that other coastal and marine ecosystems could also benefit from these financing tools as the science develops, and consequently our ability to account for the blue carbon stored within them.

POLICY AND GOVERNANCE ARRANGEMENTS

At the regulatory and institutional level, blue carbon habitats have historically suffered from a lack of protection, despite their critical importance in underpinning national food security, climate adaptation and mitigation, and poverty alleviation. Seagrasses, for instance, have long lacked dedicated protection regimes. The history of mangrove protection is different, however. Many countries offer firm protections for mangroves through domestic forest, land-use planning, water supply, coastal management, or fisheries regimes. Yet, even in these cases, this high level of nominal protection has not prevented massive habitat loss; half of the world's mangroves have been lost to deforestation and degradation, with 20% being lost between 1980 and 2005 alone.

International climate cooperation, for its part, has only recently recognized blue carbon habitats as a policy priority. The imperfect and incomplete state of blue carbon ecosystem maps – and, therefore, GHG inventories – is notable. It was not until 2013 that the IPCC issued the Wetlands Supplement,

a dedicated section on accounting for emissions from the conversion and drainage of coastal wetlands (IPCC, 2014), and there continues to be a lack of clarity about the territorial reach of GHG inventories (Green et al., 2021). Countries frequently fail to include and trace coastal carbon stock changes within GHG inventories, forestry inventories, or REDD+ accounting frameworks.

INNOVATIONS FROM THE PARIS FRAMEWORK

The Paris Agreement notes the “importance of ensuring the integrity of all ecosystems, including oceans, and the protection of biodiversity.” In particular, Article 5.1 urges Parties to take action to conserve and enhance GHG sinks and reservoirs “including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems.”

Indeed, natural ecosystems play an important role in the nationally determined contributions (NDCs) that Parties must regularly submit. WWF's NDC – *A Force for Nature?* study (2021) found that more than 90% of current NDCs included NbS for climate mitigation or adaptation, many of which focus on coastal or marine ecosystems. Such NbS are also linked to economic and social co-benefits, including SDG 1 (no poverty), SDG 2 (no hunger), SDG 4 (quality education), and SDG 5 (gender equality).

In 2019, the Conference of the Parties (COP) of the Climate Convention mandated its first ever dialogue to consider how to strengthen ocean-based action on climate change mitigation and adaptation. At COP 26, in the Glasgow Climate Pact 2021, governments permanently anchored the inclusion of strengthened ocean-based action under the UNFCCC multilateral process. As part of this mandate, Parties invited the SBSTA Chair to hold an annual dialogue on ocean and climate to strengthen ocean-based action. The most recent Ocean and Climate Dialogue was held in June 2023, where finance for coastal ecosystem restoration and blue carbon ecosystems continued to feature prominently.



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CURRENT GAPS IN BLUE CARBON FINANCING

There is a huge gap in the finance needed to achieve global targets on climate and nature. Blue carbon ecosystems are among the least financed of all. If structural obstacles to finance can be overcome, there is immense potential to contribute to the delivery of global targets by restoring, protecting and sustainably managing these critical habitats.

Averting the drivers of degradation and reversing damage in favour of long-term conservation of blue carbon habitats will require significant and concerted action. In December 2022, the Conference of the Parties to the Convention on Biological Diversity (CBD) adopted the Kunming-Montreal Global

Biodiversity Framework, which supports the achievement of the Sustainable Development Goals and sets out an ambitious pathway to reach the global vision of a world living in harmony with nature by 2050. Among the framework's key elements are four goals for 2050 and 23 targets for 2030.

These include relevant ocean and climate-related targets, including:

TARGET 1:

Ensure that all areas are under participatory, integrated and biodiversity inclusive spatial planning and/or effective management processes addressing land- and sea-use change, to bring the loss of areas of high biodiversity importance, including ecosystems of high ecological integrity, close to zero by 2030, while respecting the rights of indigenous peoples and local communities.

TARGET 2:

Ensure that by 2030 at least 30 per cent of areas of degraded terrestrial, inland water, and marine and coastal ecosystems are under effective restoration, in order to enhance biodiversity and ecosystem functions and services, ecological integrity and connectivity.

TARGET 3:

Ensure and enable that by 2030 at least 30 per cent of terrestrial and inland water areas, and of marine and coastal areas, especially areas of particular importance for biodiversity and ecosystem functions and services, are effectively conserved and managed through ecologically representative, well-connected and equitably governed systems of protected areas and other effective area-based conservation measures, recognizing indigenous and traditional territories, where applicable, and integrated into

wider landscapes, seascapes and the ocean, while ensuring that any sustainable use, where appropriate in such areas, is fully consistent with conservation outcomes, recognizing and respecting the rights of indigenous peoples and local communities, including over their traditional territories.

TARGET 8:

Minimize the impact of climate change and ocean acidification on biodiversity and increase its resilience through mitigation, adaptation, and disaster risk reduction actions, including through nature-based solutions and/or ecosystem-based approaches, while minimizing negative and fostering positive impacts of climate action on biodiversity. 2. Meeting people's needs through sustainable use and benefit-sharing.

TARGET 10:

Ensure that areas under agriculture, aquaculture, fisheries and forestry are managed sustainably, in particular through the sustainable use of biodiversity, including through a substantial increase of the application of biodiversity friendly practices, such as sustainable intensification, agroecological and other innovative approaches, contributing to the resilience and long-term efficiency and productivity of these production systems, and to food security, conserving and restoring biodiversity and maintaining nature's contributions to people, including ecosystem functions and services.

The gap in finance to achieve these targets is estimated to be at least US\$700 billion per year up to 2030 (CBD, 2020). A recent study (Deutz et al., 2020) put annual funding needs to 2050 for mangrove restoration at US\$0.3–1.6 billion, seagrass restoration at US\$21.7 billion, and saltmarsh restoration at US\$4.8–14.4 billion. Costs for conservation are additional: US\$192 billion annually for the management of protected areas, and US\$47 billion annually for sustainable fisheries.

However, ocean and coastal NbS currently receive less than 1% of international climate finance (Barber et al., 2021). The role of blue carbon in international carbon markets has also, to date, been minimal. Such investments are rarely profitable from a business standpoint, as opposed to the wider macro-economic perspective, for which the benefits of blue carbon protection and restoration are well demonstrated.

Overall, around US\$133 billion currently flows to NbS, and there

are calls to triple that amount by 2030 and quadruple it by 2050 in order to meet the magnitude of the threats (UNEP, 2021).

Encouragingly, interest and investment in NbS are growing, especially from the private sector (Hacking et al., 2021, *Forest Trends*, 2022).

Potential growth at this scale could address the current imbalance of funding focussed on ocean and coastal NbS. However, accelerating NbS implementation without concrete, principled guidance also represents a major risk. Without parameters and guidelines, much of this investment may reinforce institutions and power structures that do not respect human rights, protect Indigenous Peoples and local communities, or provide accountable financial management.



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THE NEED FOR A STRATEGIC APPROACH TO BLUE CARBON FINANCING

ENSURING BENEFITS TO COASTAL COMMUNITIES

NbS seek to “address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits” (UNEP, 2022). They represent integrated approaches to addressing the “triple challenge” that threatens humanity: a growing human population, climate change and biodiversity loss (Baldwin-Cantello et al., 2020).

To accomplish these ambitious goals, NbS must provide benefits to people. This requirement is included in the very definition of NbS, but more importantly, NbS interventions cannot effectively and sustainably deliver against broader societal challenges without providing net social and economic benefits for rights-holders and stakeholders affected by those interventions. Those benefits may be direct results of the intervention, like employment generation, or they may be channelled through a benefit-sharing mechanism (BSM). Benefits can include monetary payments as well as non-monetary improvements, like water and food security or improved resilience in the face of climate change. Regardless, the local communities participating in and affected by an NbS intervention must be better off as a result, which means that the benefits must sufficiently outweigh any costs (Pérez-Cirera, Cornelius and Zapata, 2021).

Unfortunately, in too many cases, sufficient benefits have failed to reach key local rights-holders and stakeholders (DiGiano, Stickler and David, 2020), often due to high costs or because BSMs were missing, poorly designed, or corrupted (Whitt, 2022). When this happens, NbS interventions risk failure, backlash, and even environmental and social harm (Hacking et al., 2021; Pérez-Cirera, Cornelius and Zapata, 2021).



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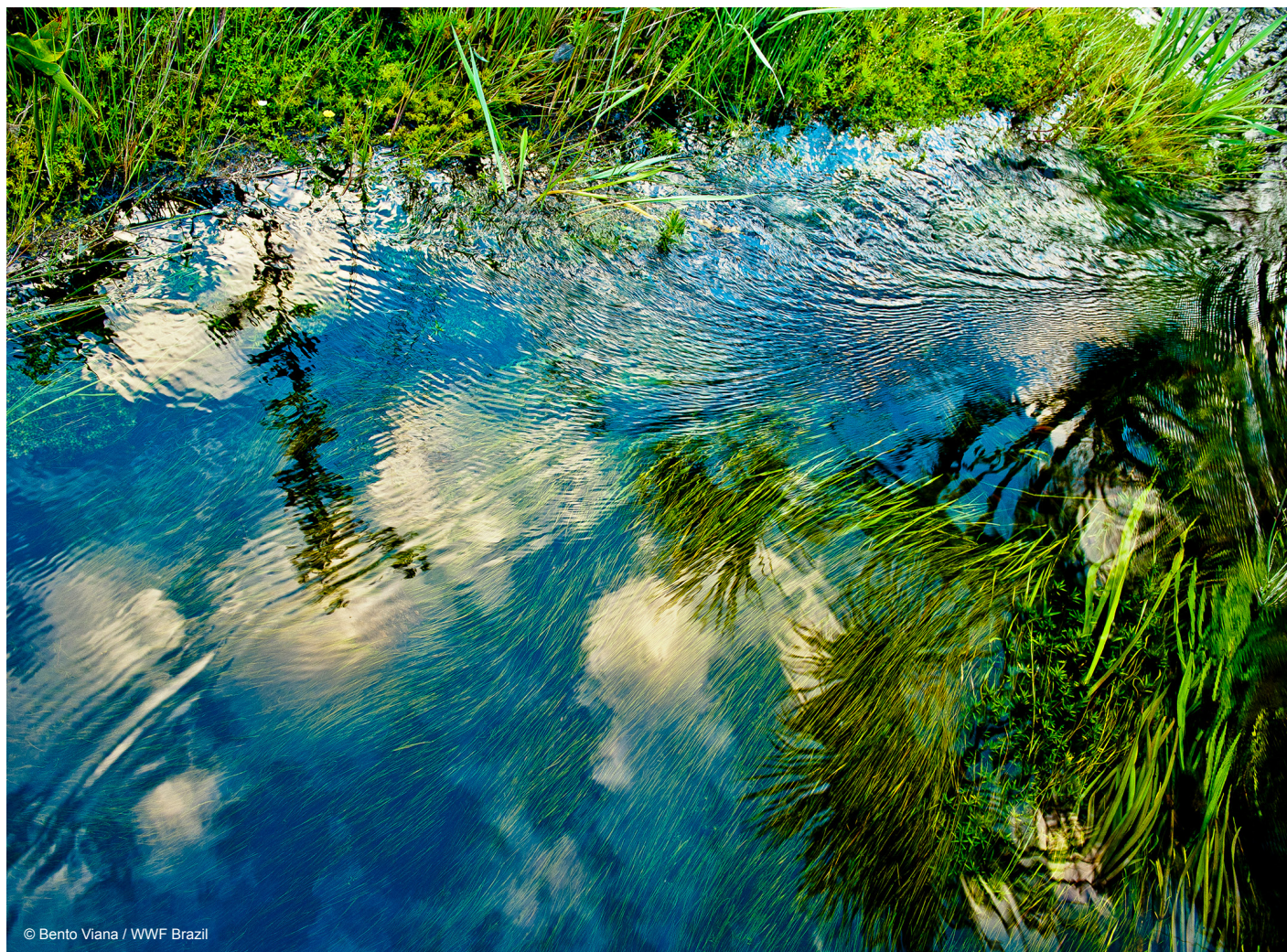
BARRIERS TO SUSTAINABLE AND EQUITABLE FINANCING OF BLUE CARBON

There are a number of reasons why blue carbon ecosystems are not yet able to attract finance at the scale and speed required. Key barriers are both financial and non-financial. They include a lack of scientific evidence and baseline data against which to measure progress, a lack of standardized methodologies, small project sizes and uncertain revenue profiles, and a lack of technical knowledge within both the developer and finance communities. In addition, the enabling environment is rarely supportive of sustainable blue carbon financing, due to complexities around governance, regulation and the lack of incentives and disincentives. These challenges are often even more acute for projects in the global South.

Financing the protection and restoration of coastal ecosystems is rarely simple. Over 40% of the global population lives within 100km of the coast, and coastal zones are targeted for urban and infrastructure development, agriculture, aquaculture and other uses, which are often supercharged by subsidies that favour unsustainable approaches. Complex tenure

and jurisdictional arrangements as well as inadequate governance plans add risk for long-term investments (von Unger et al., 2021).

Without taking into consideration avoided costs associated with protecting vital ecosystem services, the risk-return profiles of blue carbon and NbS financing are often incompatible with available finance streams. While the economic benefits of financing marine protected areas (MPAs) have been found to exceed the costs by a factor of between 1.4 and 2.7 (Brander et al., 2020), lower rates of return and bankability are less attractive to mainstream financiers (UNEP, 2021; Wharton et al., 2021). In other words, the economic benefits of coastal habitat conservation and restoration are not typically matched by real-world financial returns, which means private sector investment in this area has been scarce. Thus, it is important to consider how returns on investments can be structured in the development of blue carbon projects, as described below. The types of private finance providers, their objectives, and implications for blue forest projects can be found in WWF's 2022 report, Catalytic Sustainable Financing Approaches for Blue Forests.



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MOBILIZING RESPONSIBLE, SUSTAINABLE AND EQUITABLE BLUE CARBON FINANCE

Despite the challenges involved in creating bankable investment models, the range of social and environmental benefits delivered by blue carbon ecosystems provide opportunities to generate multiple income streams to support long-term project sustainability.

There are three main categories of financing that can support these efforts. These comprise sustainable supply chain interventions and small-scale enterprise development to abate threats on blue carbon ecosystems while supporting livelihoods; sustainable management approaches incorporating user-based fees to protect seascapes containing blue carbon ecosystems; and payments for ecosystem services, such as carbon finance, including through the voluntary carbon market (VCM) or the contribution approach.

SUSTAINABLE SUPPLY CHAIN INTERVENTIONS AND SMALL-SCALE ENTERPRISE DEVELOPMENT

Many of the countries with rich blue carbon habitats have strong economic interests in related sectors, namely fishing, agriculture, aquaculture, and tourism. Incentivizing those sectors to move to more sustainable business models, incorporating rather than destroying nature, may lead to new financing opportunities.

Sustainable tourism and sustainable fisheries are key elements in many national blue economy strategies. Particularly promising activities with a blue carbon angle include sustainable tourism linked to MPAs, and sustainable aquaculture, such as silvofishery linked to the restoration of abandoned and underused shrimp ponds, and seaweed aquaculture. A growing number of international impact funds specialize in investments that integrate NbS to support the transformation toward sustainable tourism, fisheries and infrastructure, some of them with technical support facilities attached. The design of investment-ready projects in these sectors should be a priority.

The pipeline of blue carbon enterprises is, however, limited due to a range of barriers. The small-scale nature of many coastal community livelihoods, the complex governance and tenure arrangements in coastal areas, limited capacity to create robust business plans and manage finance, and a lack of precedent

deals mean that most small-scale coastal enterprises are considered too small or too risky to finance. This is particularly true when considering private sector finance. Financial, technical and governance support for the development and transition of sustainable small-scale enterprises dependent on healthy blue carbon ecosystems, particularly in the coastal community context, will be critical.

In particular, the enabling environment needs to be addressed to strengthen access to finance for small-scale community enterprises. This includes strengthening on-the-ground governance structures and ensuring that national and local policy, and planning and development ambitions in the coastal fringes, do not undermine sustainable development opportunities for coastal communities. A focus on restoring, protecting and sustainably managing coastal ecosystems that offer critical goods and services such as food and livelihood security and coastal protection is the bedrock of an inclusive sustainable blue economy. Strong incentives for sustainable approaches and disincentives for unsustainable activities should also be part of a supportive enabling environment.

A dedicated capacity building effort with communities and the civil society organizations that support their efforts to develop sustainable blue economy enterprises or NbS-related projects is needed through blue venture, incubation and acceleration approaches. Such efforts should include support for business planning and financial management, governance, securing seed investment, policy and investment regimes, and other areas like sustainability and inclusion.

There needs to be greater focus on designing mechanisms such as aggregated investment vehicles that bring together multiple smaller enterprises or projects into a single investment portfolio. This can help to improve the attractiveness of investments by adjusting the risk-return profile and reducing transaction costs, but is reliant on the development of a sufficient volume of high-quality aligned projects.

SUSTAINABLE MANAGEMENT APPROACHES AND USER FEES

Well-managed, scientifically designed marine protected and conserved areas (MPCAs) are a critical tool to conserve important marine ecosystems, including blue carbon habitats, and allow them to recover over time by reducing threats and pressures (Edgar, 2014). MPCAs require long-term, stable and predictable revenue streams to fund restoration and conservation work. Several governments, sometimes in partnership with NGOs, have adopted various forms of user fees to raise money. For example, Belize funds its Protected Areas Conservation Trust through tourism charges – specifically, a conservation fee paid by overnight visitors and a commission from cruise ship passengers.

Perhaps more common are charges levied on visitors to designated MPCAs and/or on businesses that use resources within them. However, the appropriateness of charging local enterprises is highly context-dependent and this approach can be challenging, as it may be viewed as an additional tax on local communities. There may also be opportunities to levy conservation contributions from sectors with an interest in the broader ocean domain, such as shipping and offshore energy companies, thus broadening the revenue base.

User fees are often supplemented with funds from other sources, such as public budgets, development aid, or philanthropic donations. Other user fee models include public-private partnerships, whereby an NGO or private company

secures a long-term lease to (co-)manage a protected area, then levies user fees to raise funds for its conservation activities. It is vital that these ecosystems are viewed as national assets which should be prioritized to help countries deliver climate and biodiversity targets. As such, levies could be applied to a wider range of ocean users that benefit from a resilient seascape.

PAYMENT FOR ECOSYSTEM SERVICES AND VOLUNTARY BLUE CARBON CREDITS

Businesses and consumers have long paid for some ecosystem services, the most established of which is the provision of clean water, with annual transactions worldwide worth US\$36-42 billion (Salzman et al., 2018). Compensation for other services, such as flood protection, biodiversity protection and climate mitigation, is more elusive. In the past, the provision of these ecosystem services was sometimes paid for by communities, governments, or philanthropy, or was not paid for at all.

In recent years, however, a growing number of schemes have been established to have businesses and/or consumers pay for these more elusive ecosystem services, or to reward specific activities for protecting them. On the marine and coastal side, various schemes concentrate on fisheries, granting communities minimum quotas or priority access. Others are designed to pay coastal communities for the protection of specific habitats, including mangroves. In these cases, local communities are mostly compensated through government or donor funds.



Climate mitigation potential

While the estimated ranges are broad and the calculations used rest on many assumptions that are not necessarily robust, a recent report (Claes et al., 2022) estimated that the climate mitigation potential from “established” blue carbon interventions – conservation and restoration of mangroves, salt marshes, and seagrasses (and not accounting for emerging interventions in kelp forests, seaweed, and ocean sediment) – is up to 1.2 gigatonnes of equivalent carbon dioxide (Gt CO₂e) annually. For comparison, this is similar to the carbon sequestered by 20 billion trees grown over a 10-year period. This figure increases to approximately 3 Gt CO₂e if the emerging interventions are included. It also estimated that one-third of these interventions could be implemented at a price of less than US\$18 per tonne. There is enormous potential for mitigation finance but most drivers of degradation can only meaningfully be addressed with regulatory, government-level support. In general, blue carbon is still too new to be consistently placed within jurisdictional frameworks. Nevertheless, there is an increasing blue carbon focus in NDCs and inventories, which means this major stumbling block for country-wide GHG accounting should improve over time.

BLUE CARBON MARKETS – IMPLEMENTING THE CORPORATE MITIGATION BLUEPRINT

Increasing attention has also been given to the potential for carbon markets to help mobilize private finance. It is therefore vital that this flow of capital is directed toward the highest-quality NbS interventions – those that protect nature and support people’s livelihoods, while also mitigating and adapting to climate change. WWF’s views on implementing high-impact and high-quality NbS for climate mitigation from the perspective of the people and the places where we work is set out in our report *Beyond Carbon Credits: A Blueprint for High Quality Interventions that Work for People, Nature and Climate*.

When seeking to participate in the voluntary carbon market, WWF strongly advocates the need to follow the mitigation hierarchy and promote market transformation, which means prioritizing value chain emissions reductions before considering any other options. Once such a strategy is developed and underway, funders can go beyond value chain mitigation to carefully selected nature-based investments. WWF’s blueprints outline our guidance toward high-quality interventions and high-integrity investments (supply-side [here](#), and demand-side [here](#)), which are applicable to blue carbon ecosystems and can help guide their search for high-quality solutions that benefit people and nature.

It is important to note that the voluntary market for blue carbon credits has, to date, remained limited in scale. This is due to a variety of factors, including the size of blue carbon projects, which often occur at smaller scales than terrestrial projects. This, in turn, limits interest in carbon credit generation associated with restoration of these habitats. Furthermore, the science behind blue carbon accounting is still in development, especially for sub-tidal habitats (e.g. seagrass) and seabed carbon, with some concluding that it could be too early to engage in blue carbon crediting even with the actionable blue carbon habitats of mangroves, saltmarshes and seagrass (Williamson et al., 2022). While transparent and measurable climate benefits are a priority, interventions that are narrowly designed or focused on generating carbon credits can miss opportunities to maximize the benefits of their other ecosystem services and can fail to address the underlying drivers of nature loss.

While blue carbon markets are growing in significance, they are certainly not the only way to value climate and nature benefits and to direct investments toward blue carbon habitats. Indeed, new corporate approaches to climate and nature based on contributions, not offsets, provide opportunities for achieving high-impact climate and nature actions that are wider in scope, delivering a range of ecosystem services that provide adaptation and community resilience alike. Through direct investments into coastal ecosystem restoration, protection and sustainable management, as well as innovation and transformation of current business-as-usual pathways, businesses can do much to further society’s move toward sustainable development pathways that reduce pressure on blue carbon habitats and enable a net-zero economy.

WWF recommends that corporations follow four key steps to address their impact on climate and nature, set out in our [Blueprint for Corporate Action on Climate and Nature](#): (1) Account and disclose emissions across the value chain (Scopes 1, 2 and 3); (2) Reduce value chain emissions, in line with an ambitious [science-based target pathway](#); (3) Make a financial commitment that moves beyond offsetting to the “contribution approach” and internalizes the external costs of any remaining GHGs, and disclose all assumptions, including the carbon price used; and (4) Direct the financial commitment to a menu of potential high-impact climate and nature actions. Some of these actions might generate quantifiable emissions reductions or remove carbon from the atmosphere, while others might unlock the pipeline of future climate-based solutions (e.g. by investing in blue carbon science).

With the “contribution approach,” corporations that are implementing science-based targets also contribute to financing for climate solutions beyond their value chains, based on a carbon price far above that generally practised in the voluntary carbon market. The contribution approach provides a way for companies and other entities to assume responsibility for the negative climate impacts resulting from the GHG emissions generated by their operations. This approach is an alternative to the more common offsetting approach, where companies purchase a carbon credit that is supposed to represent 1 tonne of emissions reduction or removals, based on a “tonne for tonne” offsetting logic. The contribution approach is called the “money for tonne” approach because it involves an entity measuring its emissions (in tonnes) and then pricing the damage from these emissions using an explicit carbon price to get an estimate of its financial responsibility.

In a second but equally important step, the entity is expected to invest this estimated figure into actions that contribute to the global effort to achieve net zero emissions by reducing GHG emissions and enhancing removals, along with other investments needed to reach this goal. Under this approach, the entity can claim credit for contributing toward mitigating emissions and achieving global net zero as part of its responsibility toward climate mitigation, but not claiming climate neutrality or claiming its emissions are negated or neutralized through offsets. This approach is particularly applicable to blue carbon habitats, whereby the value of carbon storage is only one aspect of the overall contribution of their ecosystem services.

NEW FORMS OF FINANCE FOR BLUE CARBON

Novel and innovative financing approaches – including blue bonds, debt-for-nature swaps, and project finance for permanence (PFP) – are being tested and rolled out to increase the level of funding for conservation and restoration in coastal zones. While these approaches offer great promise and may include blue carbon habitats, the blended finance mechanisms are developing rapidly and have therefore not been addressed in detail here. Some of these are described in more detail within the Financial Roadmap for the Mangrove Breakthrough (Systemiq, 2023).

THE CRITICAL ROLE OF COASTAL COMMUNITIES IN DELIVERING THE PARIS AGREEMENT AND GLOBAL BIODIVERSITY FRAMEWORK TARGETS

Communities have a critical role to play as stewards of coastal ecosystems, and while many self-organize around beach management units, locally managed marine areas or other governance structures, they receive limited finance to support their efforts.

The protection, restoration and effective management of blue carbon habitats can be part of an integrated transition to a sustainable blue economy if coastal communities are empowered and resourced to manage their natural assets in a sustainable way.

New capital flows must be proactively directed at supporting the sustainable development objectives of coastal communities, including enabling:

- The transition away from destructive practices in mangroves, seagrasses and other marine habitats, and toward more sustainable development pathways;
- The creation of new enterprises and approaches that have net positive outcomes, such as restoring and protecting blue carbon habitats and reducing pollution; and
- The diversification of enterprises that create value without causing significant harm to coastal ecosystems, reducing pressure on a particular resource at any one time, such as seaweed gleaning during recovery periods of priority fisheries.

Four key approaches are required:

- 1 Strengthening on-the-ground governance structures and ensuring that national and local policies for the coastal areas do not undermine sustainable development opportunities.
- 2 A dedicated capacity-building effort with communities and civil society organizations, including support with business planning and financial management, securing seed investment, and other areas such as sustainability and inclusion.
- 3 Aggregate projects into consolidated investment portfolios to improve the risk-return profile and reduce transaction costs.
- 4 Provide clear guidelines for what to finance and what to avoid across the three broad outcomes, namely: (i) the transition away from destructive practices; (ii) the creation of new enterprises and approaches that have net-positive outcomes to nature and climate; and (iii) diversification of enterprises that will create value without causing significant harm to coastal ecosystems.



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A COHERENT FRAMEWORK FOR THE SUSTAINABLE, JUST AND EQUITABLE FINANCING OF BLUE CARBON



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RESPONSIBLE INVESTMENT PRINCIPLES

WWF has created a [set of criteria](#) to ensure that investments in NbS deliver real, meaningful and measurable benefits for people, nature and the climate, and do so increasingly at sub-national to national scales, as envisioned in the Paris Agreement. That means that investments should be designed to address the three intertwined crises of climate change, biodiversity loss, and inequitable development. Importantly, the needs of land- and seascapes and dependent communities should be prioritized in the design and implementation of these investments.

NbS for climate mitigation interventions must build broad, multi-stakeholder support, with inclusive consultation from the design stage through to implementation and action. In addition, future financing of development within or dependent on blue carbon ecosystems should align fully with the [Sustainable Blue Economy Finance Principles](#), ensuring that investments are directed toward the most sustainable development pathways.

TRANSPARENCY, CREDIBILITY, AND SUSTAINABILITY

All investments in blue carbon must meet the highest thresholds of transparency, credibility, and sustainability. There must also be checks and balances to mitigate the risk of biased decision-making and conflicts of interest. Successful conservation and restoration activities must be driven by full community involvement. In particular, there is a tangible risk that investments in blue carbon ecosystems do not reach the communities with a direct stake in the conservation, management and use of these ecosystems. Transparent financial flows and equitable benefit and risk sharing is critical to underpin fair engagement with communities. This is particularly relevant for carbon finance approaches – but it also applies to any other investment in nature that yields benefits such as environmental services, community services, education, or jobs.

Dedicated efforts and integrity safeguards are required to ensure that NbS deliver benefits for people and nature and to avoid the mistakes and criticisms of the past. This is why WWF developed a report, *Integrity Principles for Benefit Sharing in Forest NbS for Climate Mitigation* (Whitt, 2022), to set out a shared statement of ambitious ethical guidelines. While these are targeted to forest interventions, they are equally applicable to blue carbon interventions.

INTEGRITY PRINCIPLES ON BENEFIT SHARING

FAIRNESS



- 1 Benefit sharing mechanisms (BSM) must be designed and implemented with deep, significant participation of stakeholders*
- 2 BSM stakeholders are broadly represented, with concrete social inclusion efforts
- 3 The definition and calculation of benefits should include diverse definitions of value.

ACCOUNTABILITY



- 4 All elements of the BSM should be transparent and understandable to all stakeholders.
- 5 Every NbS should include a resourced, effective and appropriate grievance and redress mechanism that extends to its BSM

RIGHTS-BASED APPROACH



- 6 NbS benefits should take an active human-rights based approach to Indigenous Peoples and local communities
- 7 In addition to openly and transparently consulting all stakeholders affected by an intervention, Indigenous Peoples have the right to free, prior and informed consent, as recognized by the United Nations

EFFECTIVENESS



- 8 The net value of benefits of the NbS to affected stakeholders should be positive, taking into account all costs and trade-offs
- 9 The BSM should appropriately compensate stakeholders
- 10 The BSM should maintain additionality and seek to activate positive feedback loops for people and nature
- 11 The BSM should adapt to changes in science, implementation, or the stakeholders' needs

Similarly, there are a growing number of collaborative efforts to support best practices and high-quality projects specifically focused on blue carbon.

While this document does not attempt to aggregate the results from these and other reports, it is clear there is a significant need and opportunity for blue carbon to address climate change and biodiversity loss, while also ensuring that the needs of both people and nature are met.

BLUE CARBON AS PART OF THE SUSTAINABLE BLUE ECONOMY

It is critical that blue carbon ecosystems are included into national blue economy plans as a bedrock of a sustainable

blue economy, offering a vast array of critical goods and services, including the protection of coastal infrastructure, communities and urban settings and supporting livelihoods and food security for millions of people. As such, the restoration, protection and sustainable management of blue carbon ecosystems, including strategic spatial and temporal planning, should be prioritized and built into national budgets, as part of a wider sustainable blue economy plan. Given their fundamental role in underpinning key national social and economic objectives, such a plan should aim to ensure that their conservation is prioritized when considering developments in other sectors, such as infrastructure development, energy, transport, fisheries, aquaculture, and tourism, among others.

*Stakeholders here refers to all individuals, groups, or organizations affected by a project, including rights and title holders.

CONCLUSIONS

Blue carbon is opening a wide range of opportunities, but a host of issues – from regulation to science to community rights and engagement – mean there is still work to be done to create a sound framework for investment. WWF has laid out key strategies for responsible financing of high-quality NbS as part of a wider approach to ambitious corporate climate action. Blue carbon habitats fit well within these structures and objectives, which emphasize the importance of landscape and seascape-level planning and community engagement.

Increased finance to protect and restore nature and its ability to sequester carbon are necessary if we are to achieve the 1.5°C limit to global warming as set out in the Paris Agreement.

Blue carbon ecosystems can play a critical role in meeting that target, while supporting biodiversity and coastal community well-being. They should be seen as essential to national economies, and their restoration, protection, and sustainable management should therefore be prioritized in national budgets and in public and private sector financing policies.

The increasing interest in blue carbon provides substantial opportunities in terms of policy development, finance, and protection and restoration on the ground. It also incentivizes governments to inventory and account for blue carbon habitats, alongside commitments under the Global Biodiversity Framework. Financing, while still small, is increasingly being made available through new finance tools and approaches.

Ultimately, substantial finance is required to bring about the restoration, protection and sustainable management of blue carbon ecosystems – to support strengthened governance, targeted capacity building, monitoring, control and

surveillance, business transition, and sustainable community enterprise development.

As stated in WWF's Beyond Carbon Credits Blueprint, funders should seek out best-in-class NbS for climate mitigation that ensure quality, transparency, and equitable benefit- and risk-sharing. Any claims made about investments in these interventions must be credible, supported by transparent data and analysis, and agreed to by nature stewards on the ground. Intervention design should focus on sustainability and permanence, and result in ongoing monitoring, evaluation, and reporting.

A limited fraction of this finance can be delivered via market-based approaches but there are also many opportunities using non-market-based approaches. Carbon pricing methods – whether carbon taxes or carbon markets – are powerful tools that if designed and implemented appropriately can create significant change. They are, however, complex tools that can and must be fine-tuned to serve the dual purposes of cutting emissions and supporting sustainable development, rather than detracting from it.



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RECOMMENDATIONS

WWF recommends a contribution approach where corporations and other entities that are implementing science-based targets also contribute to financing climate solutions based on a carbon price far above that generally practised in the voluntary carbon market, and without making carbon neutrality claims prior to achieving net-zero emissions through their science-based targets.

In line with this recommendation, governments, with support from civil society, academia and the private sector, should ensure that blue carbon finance delivers a range of actions and measures, including to:



Invest in blue carbon science. Robust science is fundamental to measuring the success of blue carbon project interventions. To employ transparent and accurate methods of accounting for GHG removals, we must improve mapping and monitoring of carbon stocks and flows as well as human-induced degradation trends, improve our understanding of carbon dynamics exported across marine ecosystems, and address non-CO₂ GHG changes in response to disturbance and restoration. Supporting advances in accounting technologies and developing publicly available tools/manuals is critical to addressing subsequent recommendations presented here.



Build knowledge and capacity. Efforts must be undertaken, outside of individual blue carbon projects, to build institutional capacity in order to develop and maintain (i) blue carbon science and know-how, (ii) habitat and carbon stock mapping and monitoring capacities at multiple scales, and (iii) policy support at all levels from top (NDC formulation) to field (marine spatial planning, MPCA design and management).



Incorporate blue carbon into long-term national blue economy strategies. Mobilizing high-integrity capital is critical to the protection, restoration and sustainable management of blue carbon ecosystems. However, this much-needed finance forms part of a wider blue economy, and it is therefore critical that this investment is incorporated into sustainable strategies that encompass a range of other marine sectors, including energy and transport, tourism, and infrastructure development, and that are coherent with maritime spatial planning and integrated coastal zone management processes.



Focus on generating and measuring co-benefits. Stacking income and finance streams will help to ensure project viability and deliver substantial community benefits. Integrating co-benefits beyond GHG removals can help make finance more accessible, addressing current barriers relating to blue carbon project costs, while also increasing ecosystem and community resilience associated with restoration and protection interventions.

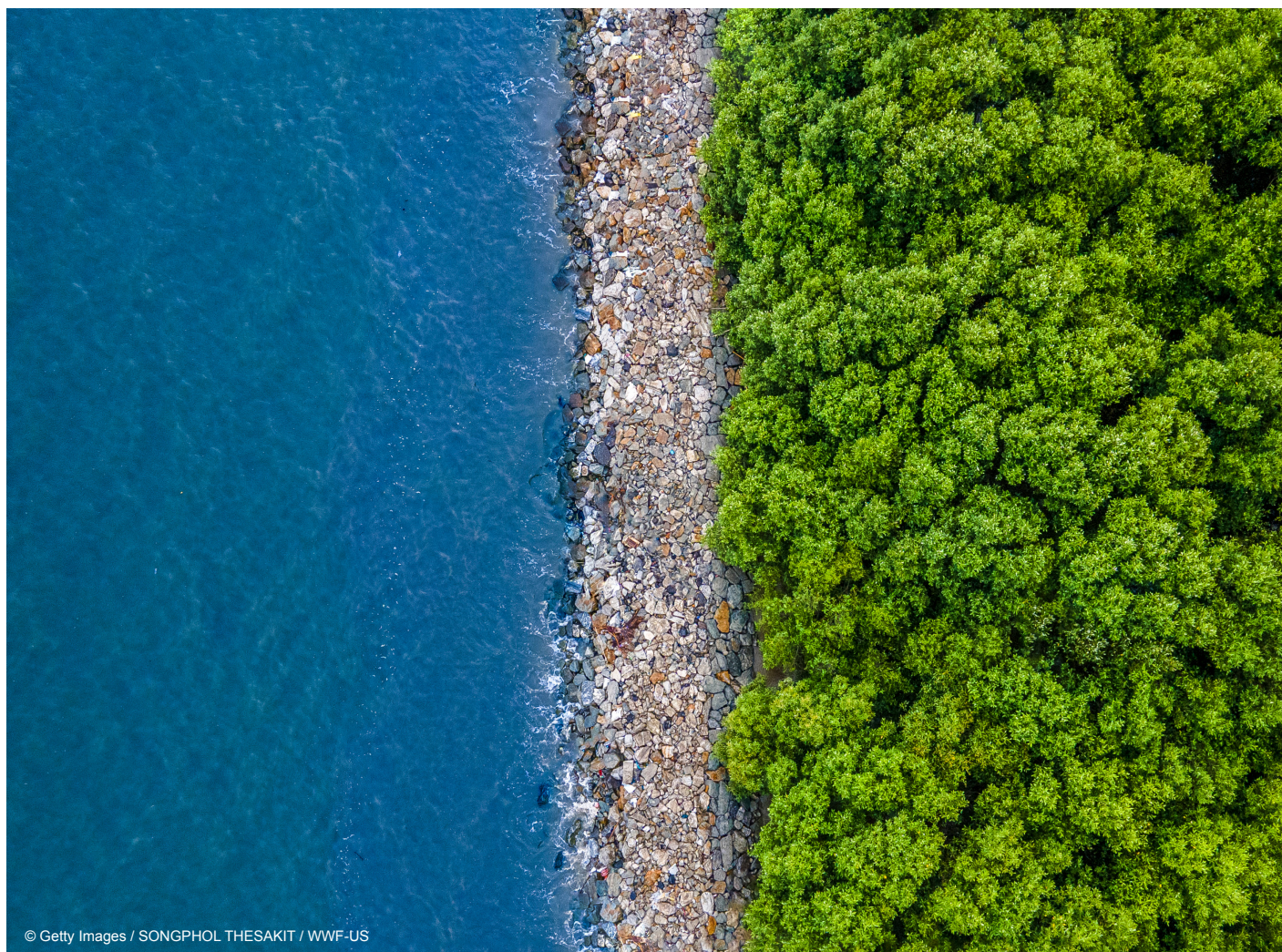


Build an ample pipeline of investible and scalable community-based projects and enterprises. Aggregating a portfolio of sustainable blue carbon projects across geographies or ecosystem markets can help to meet investors' requirements in terms of scale.

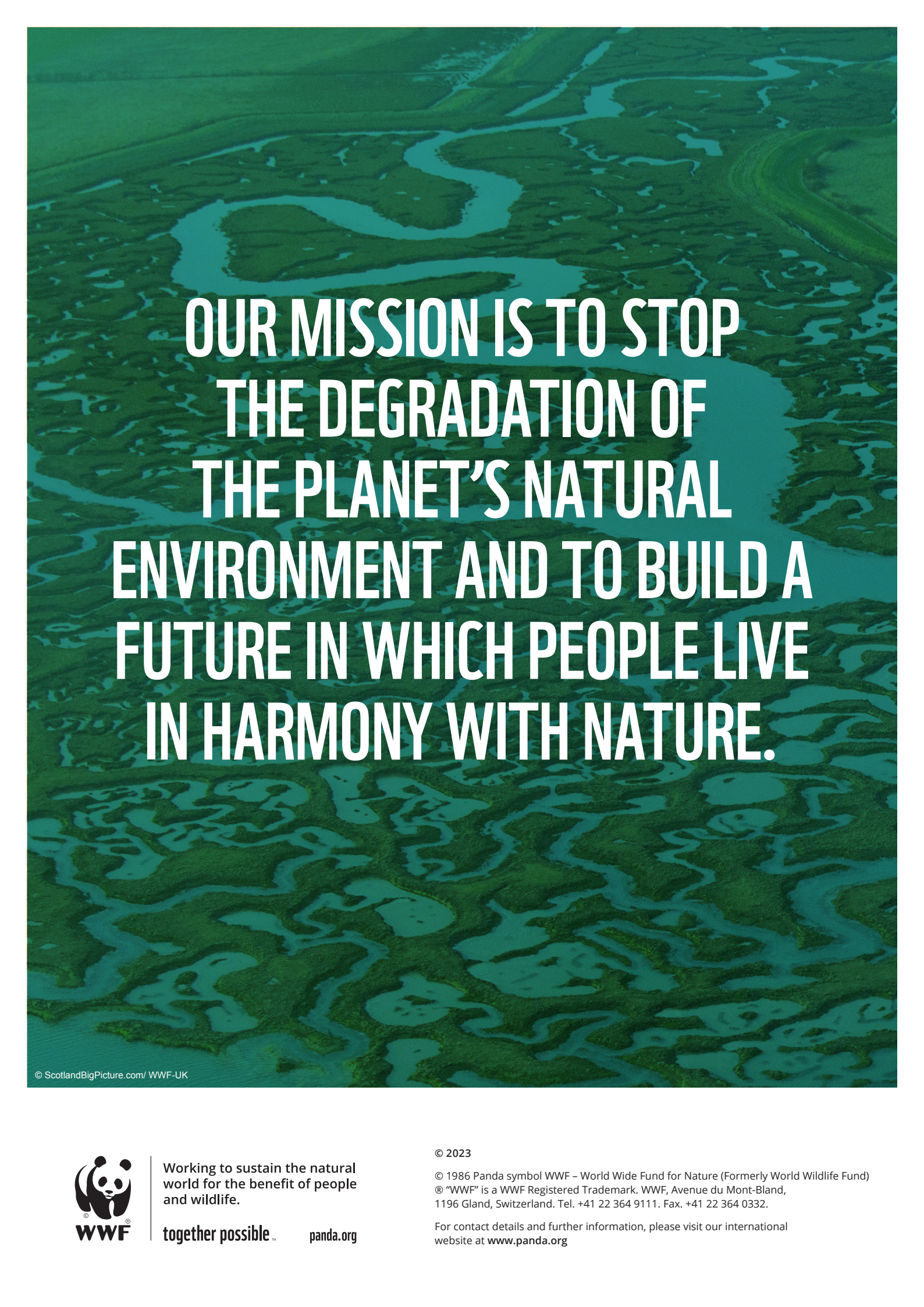
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