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 **BLUE**  
BIGDIVERSITY
Investing in Our,
and Our Ocean's, Future

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TERMS AND ABBREVIATIONS

30X30	A commitment under Target 3 of the CBD GBF to protect 30% of the world's land and seas by the year 2030	IFC	International Finance Corporation
ABS	Asset-Based Securities	IMF	International Monetary Fund
ABNJ	Areas Beyond National Jurisdiction	ILO	International Labour Organization
ADB	Asian Development Bank	IPLc	Indigenous Peoples and Local communities
AfDB	African Development Bank	INC	Intergovernmental Negotiating Committee of the WTO
BBNJ	Biodiversity Beyond National Jurisdiction (used synonymously with ABNJ)	KPI	Key Performance Indicators
Blue Biodiversity	Also known as Blue Nature, refers to the biodiversity found in marine and coastal ecosystems and the ecosystem services that flow from them	MDB	Multilateral Development Bank
Blue Biotrade	Sustainable use and trade of marine resources that improve livelihoods while protecting the ocean	MPA	Marine Protected Area
Blue Economy	Maritime industries and uses practiced in a sustainable manner	MSP	Marine or Maritime Spatial Planning
CBD	Convention on Biological Diversity	NBSAP	Nationally Biodiversity Strategy and Action Plan
CCRIF SPC	Caribbean Catastrophe Risk Insurance Facility -- Segregated Portfolio Company	NDC	Nationally Determined Contribution
CDB	Caribbean Development Bank	NDP	National Development Plan
COAST	Caribbean Oceans and Aquaculture Sustainability Facility	Ocean Zoning	Allocation of maritime and coastal space as stipulated in a marine plan
COP	Conference of Parties	OECD	Other Effective (area-based) Conservation Measure
DFCN	Debt for Climate and Nature	OECD	Organisation for Economic Co-operation and Development
EBM	Ecosystem-Based Management	RFMO	Regional Fisheries Management Organization
EEZ	Exclusive Economic Zone	SDGs	Sustainable Development Goals
Ecosystem Services	Nature's benefits, including provisioning, regulating, supporting, and cultural goods and services	SIDS	Small Island Developing States
FAO	Food and Agricultural Organization of the United Nations	TNC	The Nature Conservancy
GBF	Kunming Montreal Global Biodiversity Framework	UNCTAD	United Nations Commission on Trade and Development
GEF	Global Environment Facility	UNDP	United Nations Development Programme
IDB	Inter-American Development Bank	UNEP	United Nations Environment Programme
		UNFCCC	United Nations Framework Convention on Climate Change
		Whole of Economy	Integration of all sectors in management for blue economies
		WB and WBG	World Bank and World Bank Group
		WTO	World Trade Organization

THE INVALUABLE GLOBAL OCEAN



OCEAN AND HUMAN WELL-BEING

There is no denying that humankind relies on a healthy, productive global ocean.

Each day, billions of people look to the ocean for sustenance¹ and employment. Marine fisheries and aquaculture are vital for food security and provide more than 50 million direct production jobs and three times as many indirect jobs.² Over 500 million people rely on small-scale fisheries for their work and income; fisheries of all sizes are a vital source of livelihood for women, who make up close to half of all subsistence fishers.³ Nature-based tourism, in general, generates over US\$600 billion in global revenue⁴, with coral reefs contributing approximately US\$11.5 billion to

1 Marine fisheries currently provide protein for more than three billion people. See FAO 2024.

2 Teh and Sumaila 2013.

3 FAO 2024.

4 World Travel and Tourism Council 2024.

global tourism⁵. For every dollar invested in this sector, there is a sixfold return on investment, which also promotes gender equality in employment opportunities. The global ocean is also the base for growing maritime industries. At the current time, 90 percent of global trade moves by sea, with these volumes projected to triple by 2050. The ocean has also become alive with energy development in the margins of almost every continent.⁶

In addition to food and jobs, marine systems provide highly valuable ecosystem services that provide critical help against climate change—storm protection, flood control, and carbon sequestration.⁷ The dense mangrove forests that mark coastlines around the world are highly efficient at capturing carbon dioxide from the atmosphere. As sea levels rise and storms become more frequent and powerful, the forests and other forms of marine life, sea grasses and coral among them, act as a barrier. These nature-based solutions are often more effective than cast-iron and concrete constructs in shielding ocean-side communities and land.

All these uses and values rely directly on the preservation of “Blue Biodiversity – the vast variety of species and ecosystems present in marine and coastal areas around the world. But in many places these species and systems are under siege. Maritime industries—trade, tourism, energy production among them—often operate without concern over their cumulative, long-term impacts, doing immense damage to biodiversity. Some of the human uses conflict with others, and as the race to grow Blue Economies heats up, these conflicts are on the rise. Climate change is adding to these human pressures. As coastal waters rise in temperature and depth, the many life forms there may thin out or die altogether. At risk ultimately is the estimated US\$24 trillion natural capital value of the ocean, the 5 percent of global GDP that maritime sectors contribute annually to the global economy.⁸

Around the world, the immense values of the ocean and the threats they face are gaining increasing recognition. But decision-makers are struggling with how to confront the dangers to Blue Biodiversity and keep ocean ecosystems healthy and productive. The best results will come from a whole of economy approach, as this paper will demonstrate.

5 Burke et al. 2011

6 OECD 2022. Ocean shipping and shipbuilding: <https://www.oecd.org/ocean/topics/ocean-shipping/>

7 Hoegh-Guldberg 2015.

8 Ibid.

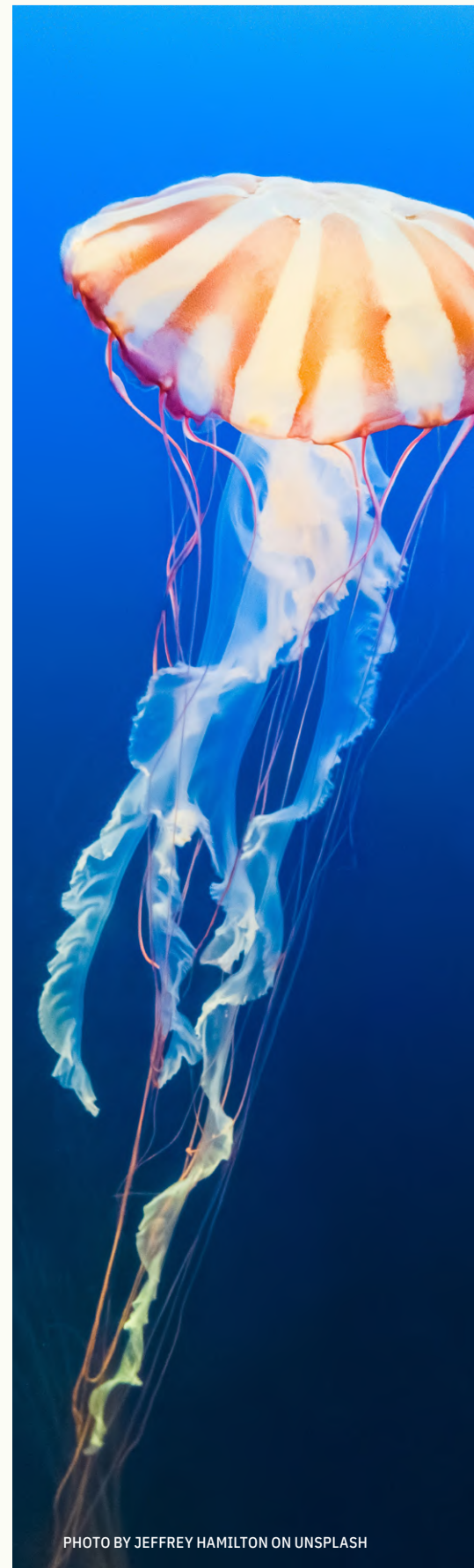
BLUE BIODIVERSITY LOSS— DRIVERS AND SOLUTIONS

Blue biodiversity is threatened by multiple human-caused pressures acting simultaneously and cumulatively over time.

These include habitat loss, unsustainable fisheries and aquaculture, pollution (from excessive nutrients, chemicals, marine debris, and plastics), and the spread of invasive species.⁹ Some of these pressures originate in the marine waters themselves, but others come as run-off from inland, reflecting how the marine and terrestrial economies are intimately linked, for good and for bad. Climate change adds its own pressures to the water's biodiversity.

Developing transformative actions to stop marine biodiversity loss for the benefit of people and nature is now a global priority. The cost-effective solution to many of these ills is area-based or spatial management -- Marine Protected Areas (MPAs) and Other Effective Conservation Measures (OECMs), as well as broader marine spatial planning (MSP). These are among the most powerful tools that we possess to safeguard Blue Biodiversity. But properly crafting them for real-world deployment will require swift action to close knowledge gaps about marine biodiversity, the goods and services that marine ecosystems furnish, and the multiple stressors that threaten their delicate balance. Why certain species and ecosystems resist pressure better than others, and when and how tipping points occur, are also poorly understood, but vital for informing management.

Answering questions like those will enable progress toward the four goals and 23 targets of the post-2020 Global Biodiversity Framework (GBF), including a commitment to protect 30 percent of the global ocean by 2030 (the 30x30 commitment). The work will also advance sustainable development as articulated in the World Bank Group's vision and mission.





GOALS OF THIS REPORT

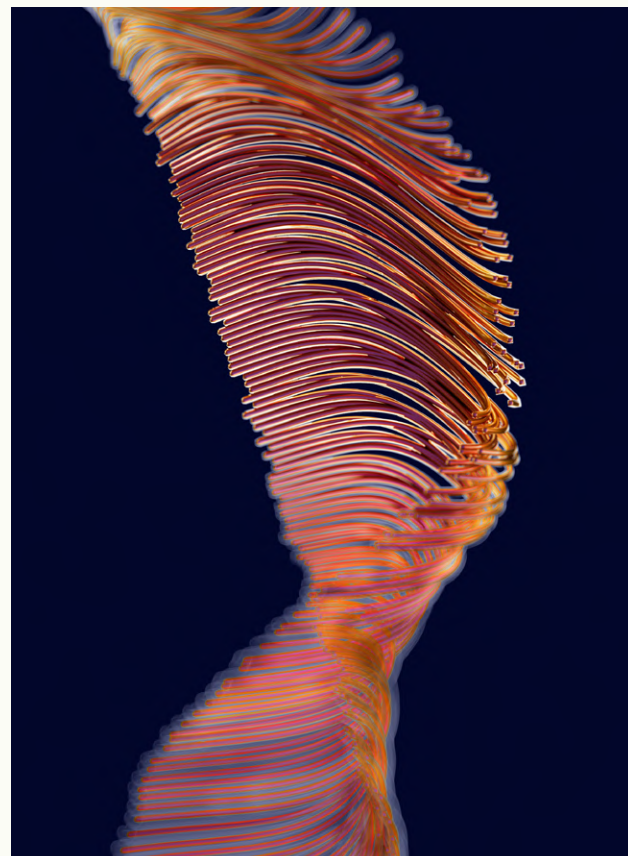
Building on the World Bank's Blue Economy approach, which calls for the sustainable and integrated development of economic sectors in a healthy ocean, this report presents lessons learned from expanding the knowledge base around Blue Biodiversity and then applying it.

The report also highlights ways that MPAs and OECMs can promote the equitable and inclusive participation of Indigenous Peoples and local communities (IPLC), women, youth, and other underrepresented people in marine management.

The authors take the wider view that marine planning, under the aegis of MSP, can facilitate the design and effective management of protected areas within a context of a broader, sustainably managed area and can reduce conflicts between different maritime sectors using ocean space. MSP can catalyze restoration across seascapes, driving enhanced ocean health and with it greater human prosperity.

Spatial management tools can also help the world's response to climate change, the other major driver of Blue Biodiversity loss. The tools can increase the resilience of the enormous and complex marine ecosystems that sequester carbon and serve as natural barriers against flooding and storms. Safeguarding these ecosystems translates into increased prosperity for the coastal communities that are on the front line of the marine effects of climate change, and through sequestration can also improve climate change metrics globally.

In sum, this report aims to communicate the what, why, and how of using spatial management to preserve marine assets and ocean vitality, highlighting best practices across the main tools and approaches. The document is modelled on other PROBLUE publications, and links to previous World Bank guidance on MSP and Blue Carbon. The authors hope it will encourage Member States to give detailed attention to marine biodiversity as they work to meet conditions of World Bank loans and their commitments under UNFCCC, the Global Biodiversity Framework, and other global goals and agreements. The intended outcome is the mainstreaming of Blue Biodiversity in government policies, harnessing the full range of financing to invest in marine management and building lasting support for protection of the world's marine ecosystems.



WHAT IS BLUE BIODIVERSITY?



PHOTO BY MERVE EKMEKCI



BLUE BIODIVERSITY DESCRIBES BOTH MARINE SPECIES RICHNESS AND BLUE NATURE BENEFITS

Sometimes called “blue nature,” Blue Biodiversity refers to the rich array of life in the global ocean.

This diversity is expressed as species richness (the number of species and the numbers of individuals or biomass within a species), the genetic diversity of populations making up the species, and the diversity of habitats or ecological communities. The variety of life captured under the Blue Biodiversity banner includes

not only marine species, but coastal and estuarine biota as well.

Blue Biodiversity also encompasses the wide spectrum of ecosystem services by which marine species enhance human well-being and planetary health. This includes the food and materials they provide, of course, but also services that safeguard communities and infrastructure and maintain planetary balances, such as regulation of wastes, flood control, and buffering land from waves and storms.¹⁰ Blue Biodiversity also provides aesthetic and recreational benefits. Indeed, it underpins cultural values in many coastal communities.

In recent years, major scientific strides have been made in understanding how biodiversity supports life on the planet and how human activities are influencing it. Still, it is not yet fully understood. Around the world, researchers continue to fine-tune knowledge of the ecosystems and how they interact with each other and with humans.

10 Ward et al. 2022.

WHY BLUE BIODIVERSITY MATTERS

PHOTO BY PIXABAY



LOSS OF MARINE BIODIVERSITY REDUCES HUMAN WELL-BEING AND IMPEDES DEVELOPMENT

Blue Biodiversity underpins all life on Earth.

The rich life of the ocean is crucial because it provides the bulk of the oxygen that we breathe in and locks away a large proportion of the carbon dioxide that we exhale, along with other carbon emissions.¹¹ In many parts of the world, living marine resources are the

most important source of protein and micronutrients available¹² and provide irreplaceable opportunities for livelihood and recreation. Life in the ocean supports cultural and spiritual practices, brings aesthetic value, and exists as a source of awe and wonder.

However, as marine biodiversity declines, ecosystems become less productive and stable. In extreme cases, regime shifts occur. Productive marine ecosystems transform into unproductive ones, such as, for example, healthy coral reefs becoming algae-dominated degraded reefs. All biodiversity loss exacts costs in terms of ecosystem functioning and delivery of benefits to humans.¹³ Around the world, coastal communities and countries are trapped in this cycle of decline--India¹⁴ and Europe¹⁵ are among places already suffering it first-hand. In a 2021 World Bank report, economists detail how loss of biodiversity of all kinds and associated ecosystem services could lead to a US\$2.7 trillion decline in global GDP by 2030.¹⁶ This fall would hit hardest in low-income countries.

11 The global ocean absorbs 93% of the world's anthropogenic heat (Stuchtey et al. 2020).

12 Millennium Ecosystem Assessment 2005.

13 Díaz et al. 2006.

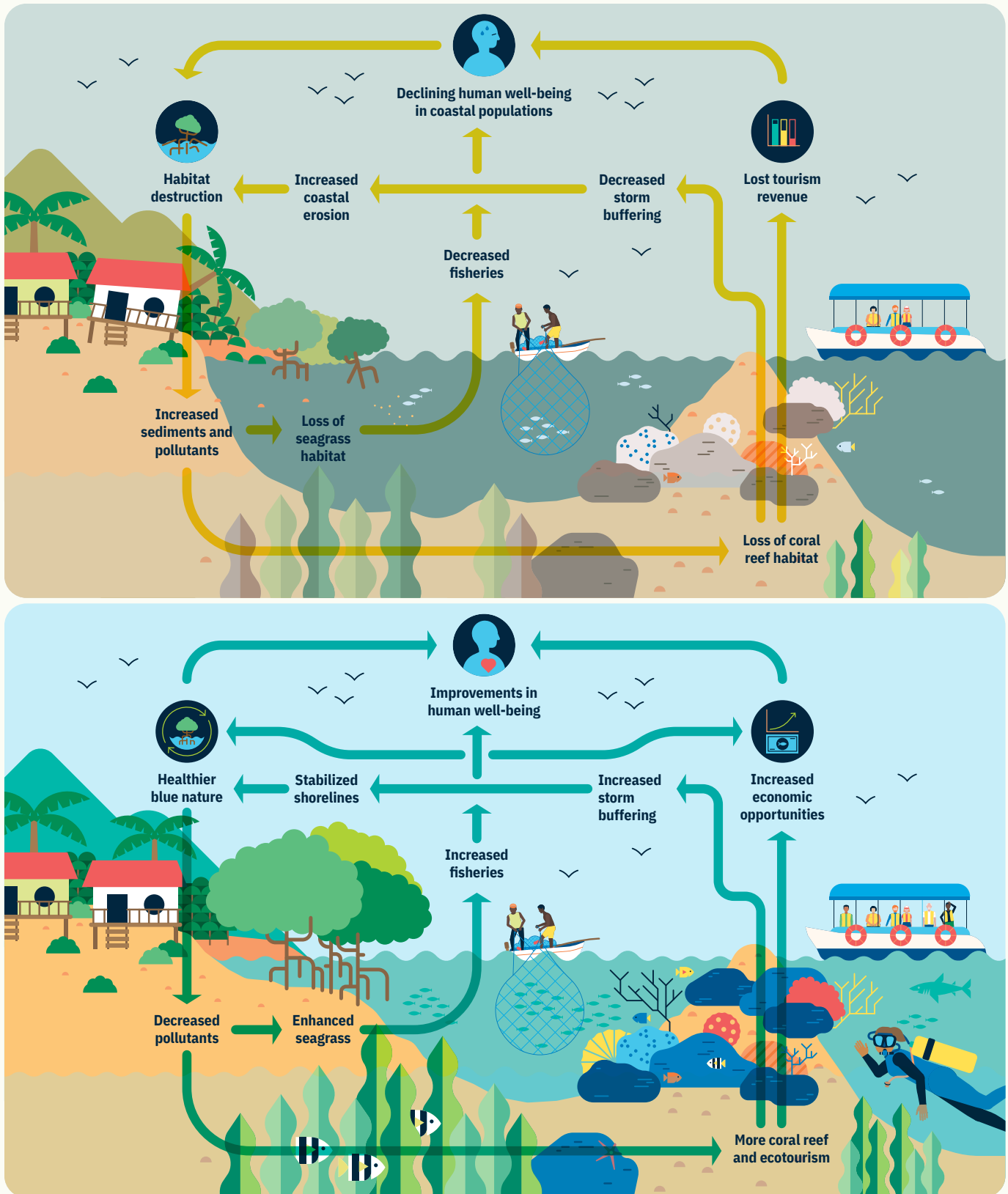
14 Lakshmi 2021, Lloret et al. 2023.

15 Davidson et al. 2023.

16 World Bank Group 2021.



FIGURE 1. THE NEGATIVE FEEDBACK CAUSED BY LOSS OF BLUE BIODIVERSITY, AND HOW THE CYCLE CAN BE TURNED ON ITS HEAD.





THE MANY BENEFITS OF ACTION TO CURTAIL BLUE BIODIVERSITY LOSS

Protecting Blue Biodiversity can invert the downward cycle and create a sustained flow of valuable goods and services benefitting humanity and all life on earth

(FIGURE 1).

Such a shift will contribute not only to U.N. Sustainable Development Goal (SDG) 14 (Life Below Water) but many of the other goals, including poverty and hunger reduction (SDGs 1 and 2), human health and well-being (SDG 3), many of the production goals (clean water SDG 6, clean energy SDG 7, economic growth SDG 8, industry and innovation SDG 9, responsible consumption SDG 12), climate action (SDG 13), and many of the equity goals (SDGs 5, 10, and 16).

Directed investment in understanding and protecting Blue Biodiversity will catalyze movement toward the goals and targets of the Global Biodiversity Framework as well. Blue biodiversity investment can be articulated in National Biodiversity Strategies and Action Plans (NBSAPs) under the Convention of Biological Diversity, Nationally-Determined Contributions (NDCs), the U.N. Framework Convention on Climate Change, and the National Development Plans that guide multilateral development bank support.

Taking action will also fulfill many targets at the national level, with particular gains for Small Island Developing States (SIDS) and other countries that depend disproportionately on a healthy ocean. For them, understanding Blue Biodiversity and tracking changes in it will be the first step. Harnessing spatial management tools such as MPAs and OECMs and broader MSP to implement plans for safeguarding biodiversity will be the next. Policies to protect Blue Biodiversity can be embedded in NBSAPs, amended NDCs, and National Development Plans. Doing so will help reduce carbon emissions and loss of biodiversity, while showing the path forward for Blue Economies.





BLUE BIODIVERSITY AND THE NEW WORLD BANK MISSION TO END EXTREME POVERTY AND BOOST PROSPERITY ON A LIVABLE PLANET

The World Bank Group vision to better integrate nature, climate and development is in full support of ambitions outlined in the Global Biodiversity Framework (GBF). COP-15 of the Convention on Biological Diversity took place in 2022 amidst the triple environmental crises of nature loss, climate change, and pollution, as well as the economic effects of conflict.

These all threaten hard-won development gains. Investing in nature, and more specifically in marine resources, offers solutions to reducing poverty and inequality and protecting the climate system and ecosystems that support livelihoods, food, and nutrition security, all of which are inherently linked.

The World Bank Group has invested in natural capital and biodiversity for decades. Since 2018, through PROBLUE, the institution has put a stronger focus on marine natural capital. The Environment, Natural Resources, and the Blue Economy (ENB) team is reviewing the Bank's approach to best support the implementation of the GBF, by strengthening the protection and restoration of marine ecosystems through policy, development programs, and strategic investments.

The World Bank Group continues to be a leading actor on biodiversity and nature. Its portfolio supporting global public goods (including climate change and nature) has more than tripled over the last decade (from US\$31 billion in FY13 to US\$101 billion in FY22) and accounts for more than half of all its lending. Overall, the WBG is raising the agenda of biodiversity, pollution, and climate change to support the implementation of the GBF, in addition to the WTO agreement on fisheries subsidies and the Intergovernmental Negotiating Committee (INC) negotiations on ending plastics pollution. These high-level commitments have increased demand for action and investment in nature, climate, and biodiversity. These effects are highlighted in the new World Bank mission [to create a world free of poverty – on a livable planet.](#)

THE ECONOMICS OF BLUE BIODIVERSITY



BLUE BIODIVERSITY UNDERPINS OCEAN VALUES

Blue biodiversity provides food, income, shelter, medicine, transport, waste management, recreation, treatment for disease, education, and many other ecosystem services (see Figure 2 for a graphical representation of some of these services).

The value of marketable ocean goods and services – the blue asset base – has been estimated at approximately US\$24 trillion, underpinning a “gross marine product” of goods and services of US\$2.5 trillion annually.¹⁷ If this value is compared to the world’s top 10 economies, the ocean ranks seventh globally, behind the United States, China, Japan, Germany, France, and the United Kingdom, and ahead of such economic powerhouses as Brazil and India.¹⁸ More than two-thirds of the annual value of ocean goods and services relies on healthy conditions to maintain outputs¹⁹ – in other words, this huge ocean economy depends directly on Blue Biodiversity.

17 WWF 2020.

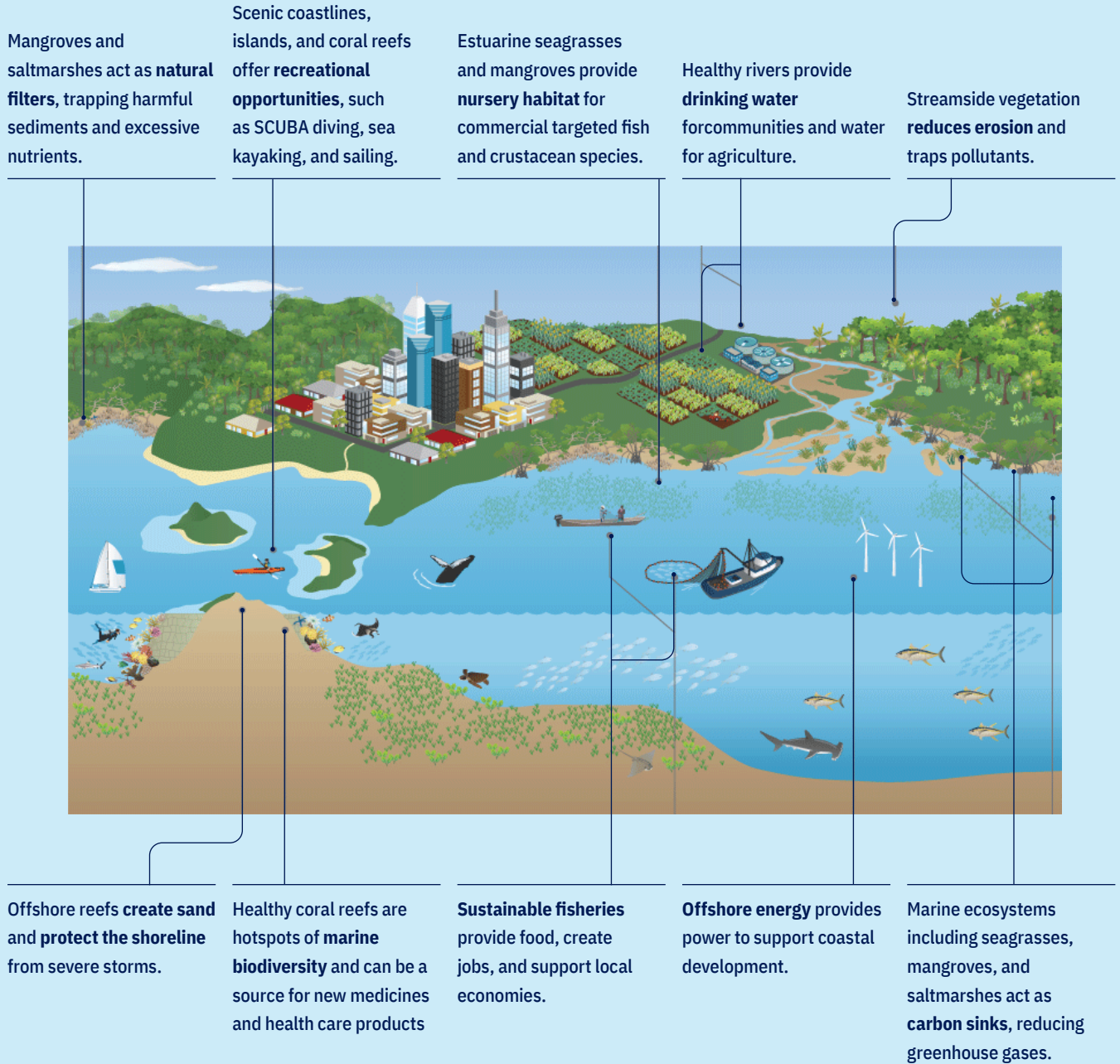
18 Hernandez et al. 2023.

19 Hoegh-Guldberg 2015.



FIGURE 2. COASTAL BLUE BIODIVERSITY AND THE ARRAY OF SERVICES IT PROVIDES.

VALUING ECOSYSTEM SERVICES



SOURCE: UNEP 2011.

Much ocean use is motivated by basic human needs.²⁰ Fulfilling these needs has created formal and informal job markets. Ocean-based industries in the formal economy are rapidly growing and now make up perhaps 3.5 to 7 percent of global GDP and provide at least 31 million direct full-time jobs.²¹ The informal Blue Economy is harder to measure, though estimates suggest that in coastal countries and small island states, it accounts for the bulk of employment. In the global economy at large, more than 60 percent of the adult labor force works in the informal sector, contributing on average up to a third of a country's GDP.²² Women account for a large proportion of this labor, but are usually overlooked in official and unofficial statistics.

PHOTO BY PAWEL KALISINSKI



Beyond economic benefits of jobs and GDP, Blue Biodiversity also supports mental and physical health, even in communities not wholly dependent on the ocean for livelihoods. Underlying services include reduced stress, the chance to engage with nature, improved air quality, and artistic inspiration.²³ In the wake of the global Covid pandemic, connection to nature, including ocean and coasts, is more important than ever.²⁴ Getting a clear measure of such benefits is difficult, but quality of life around the globe would surely slip without them.

20 Winther et al. 2020.

21 Konar and Ding 2020.

22 Igin et al. 2021.

23 Hernandez et al. 2023, Sumaila et al. 2023.

24 Robinson et al. 2021.

SAFEGUARDING BLUE NATURE AND THE OCEAN ASSET BASE



SPECIAL CHALLENGES IN THE BLUE

Protecting Blue Biodiversity values is a complex task. Many common-pool resources, or blue commons, are open access, including coastal ecosystems such as mangroves and coral reefs.

Tracking and maintaining open ocean resources within the Exclusive Economic Zone (EEZ) of coastal countries and in globally-shared ecosystems such as those in Areas Beyond National Jurisdiction (ABNJ) present special challenges. For example, many marine species commonly migrate between national jurisdictions or between national and global blue commons.²⁵

BIODIVERSITY ASSESSMENTS AND IDENTIFICATION OF PRIORITY SPACES

Although significant gaps remain in our understanding of Blue Biodiversity, it remains the subject of constant surveying and modeling in parts of the world ocean. This work is taking place at the site, sub-regional, national, and international levels.²⁶

Regional seas organizations are in many cases able to paint a comprehensive picture of trends in biodiversity in their waters and in the decline in ecosystem services that accompany its loss. For example, OSPAR's latest Quality Status Report 2023 documents trends in biodiversity ranging from marine birds, mammals, and fishes to benthic habitats and marine food webs.²⁷ Priority hotspots for Blue Biodiversity are getting increasing attention. Data and analytics maintained by the World Bank and partners have enhanced understanding of trends in marine biodiversity, as well as implications for jobs, the wider economy, and human well-being.

Appraisals can identify gaps in understanding that need targeted research and monitoring. Once priority spaces and issues are identified, spatial management can follow. This runs the gamut from area-based management tools (ABMT) used by single sectors such as fisheries to multi-sector management regimes as prescribed in large-scale marine spatial plans. Along this spectrum are marine protected areas (MPAs) and Other Effective area-based Conservation Measures (OECMs), sub-national marine spatial planning (MSP), and habitat restoration – undertaken either within protected areas or embedded into wider marine plans.

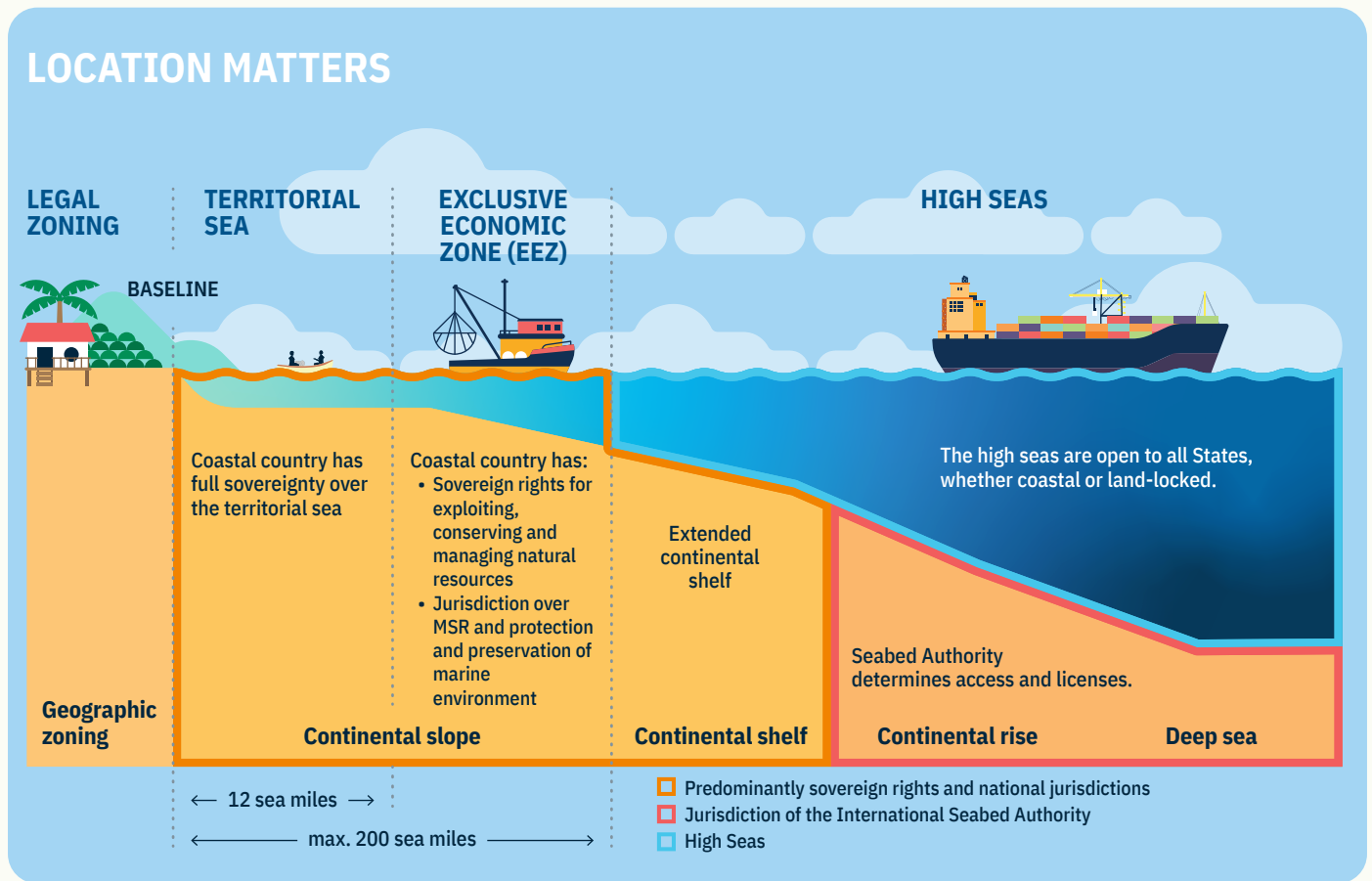
In the current discussion, we focus on tools commonly used to safeguard Blue Biodiversity within the jurisdiction of coastal countries – that is, in coastal areas (including land and freshwater), in territorial seas, and in broader Exclusive Economic Zones (EEZs) or similar extensions of jurisdiction (see Figure 3). We review these tools and enabling conditions for them to generate biodiversity-positive outcomes. We then consider financing instruments that are available to support this protection.

²⁶ A noteworthy example is a new study of Blue Biodiversity in U.S. waters, by Gignoux-Wolfsohn et al. (2024).

²⁷ <https://www.ospar.org/work-areas/cross-cutting-issues/qsr2023>



FIGURE 3: ZONES AND JURISDICTIONS IN THE MARINE ENVIRONMENT.



MARINE PROTECTED AREAS

WHAT ARE MPAs?

MPAs are coastal or oceanic management areas designed to conserve ecosystems together with their functions and resources.²⁸ MPAs come in many sorts and sizes, leading to a profusion of terms to describe them. These include marine park, marine reserve, fisheries reserve, closed area, marine sanctuary,

MACPAs/MCPA (marine and coastal protected area), nature reserve, ecological reserve, replenishment reserve, marine management area, coastal preserve, area of conservation concern, sensitive sea area, biosphere reserve, no-take area, coastal park, national marine park, marine conservation area, and marine wilderness area.

MPAs' ability to accomplish a broad range of objectives and to have different meanings for different people underscores that MPA planners must clearly define targets for every MPA.²⁹ In some, conservation will be the motivating force, in others, preservation of

28 de Fontaubert et al. 1996.

29 Agardy 1997, Grorud-Colvert et al. 2020.

traditional use or sustainable use of a particular resource; still others may be a combination of these. MPAs can target conservation goals such as biodiversity maintenance, protection of rare and restricted-range species, maintenance of genetic diversity, or restoration of ecosystem functioning. Protected sites serve as refuges for species and help maintain ecological functions. They support goals such as managing fisheries, enhancing yields, restoring overexploited stocks, and providing insurance against management failures. In the event of widespread damage, these areas increase the likelihood that seed sources and recruits for recolonization and replenishment will originate from MPAs. Fostering recreation and livelihood diversification, promoting education and research, and safeguarding cultural and spiritual values are yet more purposes that MPAs can serve.



FIGURE 4. EXAMPLES OF THE MYRIAD CHALLENGES THAT MPAs CAN ADDRESS



Assessments of MPA initiatives across the globe suggest that public participation in the planning process is essential. This means engaging stakeholders at the start of the planning, so as to establish the vision, goals, and objectives of the marine plan in question. True and equitable participation means welcoming community involvement in conservation and restoration activities.



THE CHALLENGES OF DESIGN

While MPAs are a powerful tool, they are not a panacea. They cannot be applied with a one-size-fits-all approach. If they are to be worth the investment of time and resources, they need to be fit-for-purpose.

Reflecting in advance on that purpose can help government agencies, communities, and ocean users decide whether an MPA is the right tool to address the problem at hand. This problem-scoping can also help make clear the type of objectives the MPA aims to achieve.

Setting a size for the protected area is an initial conundrum: go with a smaller and simpler reserve to predictably achieve less, or go with a larger, more ambitious multiple-use area that will be inherently riskier. For instance, restricting extractive activities can

maintain biodiversity, increase biomass, increase the sizes of individual fish, and cause spillover to increase biomass in adjacent areas and raise productivity and profitability of fisheries.³⁰ If large enough, a marine reserve can maintain populations of pelagic species, as recently demonstrated in the remote Pacific where closure was correlated to high shark biomass. Yet most no-take reserves established in response to fishing or mining threat are small: in a 2018 global study, 124 no-take reserves had a mean size of 4 km², in contrast to the global MPA mean of 2,430 km², with multiple use protected areas included.³¹ These small reserves had limited success in protecting the water column and its biota given the open nature of pelagic habitats. And pollutants coming from afar can affect even benthic communities that are theoretically enjoying full “protection” in an MPA.

30 Duarte et al. 2020.

31 Boonzaier and Pauly 2018.

PHOTO BY FRANCESCO UNGARO



TRADE-OFFS AND OPPORTUNITY COSTS

MPA managers face challenges beyond those that are marine-specific. These may include degradation from land-based and atmospheric pollution, impacts from accelerated climate change (such as shifting living resources and oxygen depletion), security concerns, and conflict over jurisdictions and resources. For these sorts, MPAs may not be the best tool. A better use of resources might be to invest in integrated management: marine spatial planning, and climate change mitigation policies.

MPA establishment³² and operations always come with trade-offs. Opportunity costs occur especially with no-take MPAs that restrict many practices and may alienate certain user groups. And though ecological benefits may be substantial in the MPA, wider ecosystems may suffer damage if extractive activities simply shift to uncontrolled areas.

32 Brown et al. 2001.

BEST PRACTICE MPA PLANNING

Although the size, scope, stakeholder involvement, and success of MPAs vary, getting from insight to action generally follows the same life cycle of steps:

PRE-PLANNING

The MPA life cycle begins with the birth of an idea – the idea that by protecting a specific area, threats to marine productivity and biodiversity can be abated. Such threats can be physical -- such as habitat destruction, overfishing, or pollution – but also institutional, when ecologically and culturally important areas fail to get sufficient attention.

ADAPTATION

Everything changes over time. Climate change is driving more rapid, and in many cases unknown, ecosystem changes than ever. If indicators show that things are drifting off course, the information can be used to tweak management to keep the MPA to the desired direction. Boundaries, zoning, regulations, research, budgets, and even governance may need to be adapted as conditions change—MPAs should be fully prepared for this. Adaptive management brings us back to the beginning of the MPA life cycle – even the “MPA idea” may need to be adapted (or reborn) to keep delivering benefits to the ocean and to humans who rely on it.

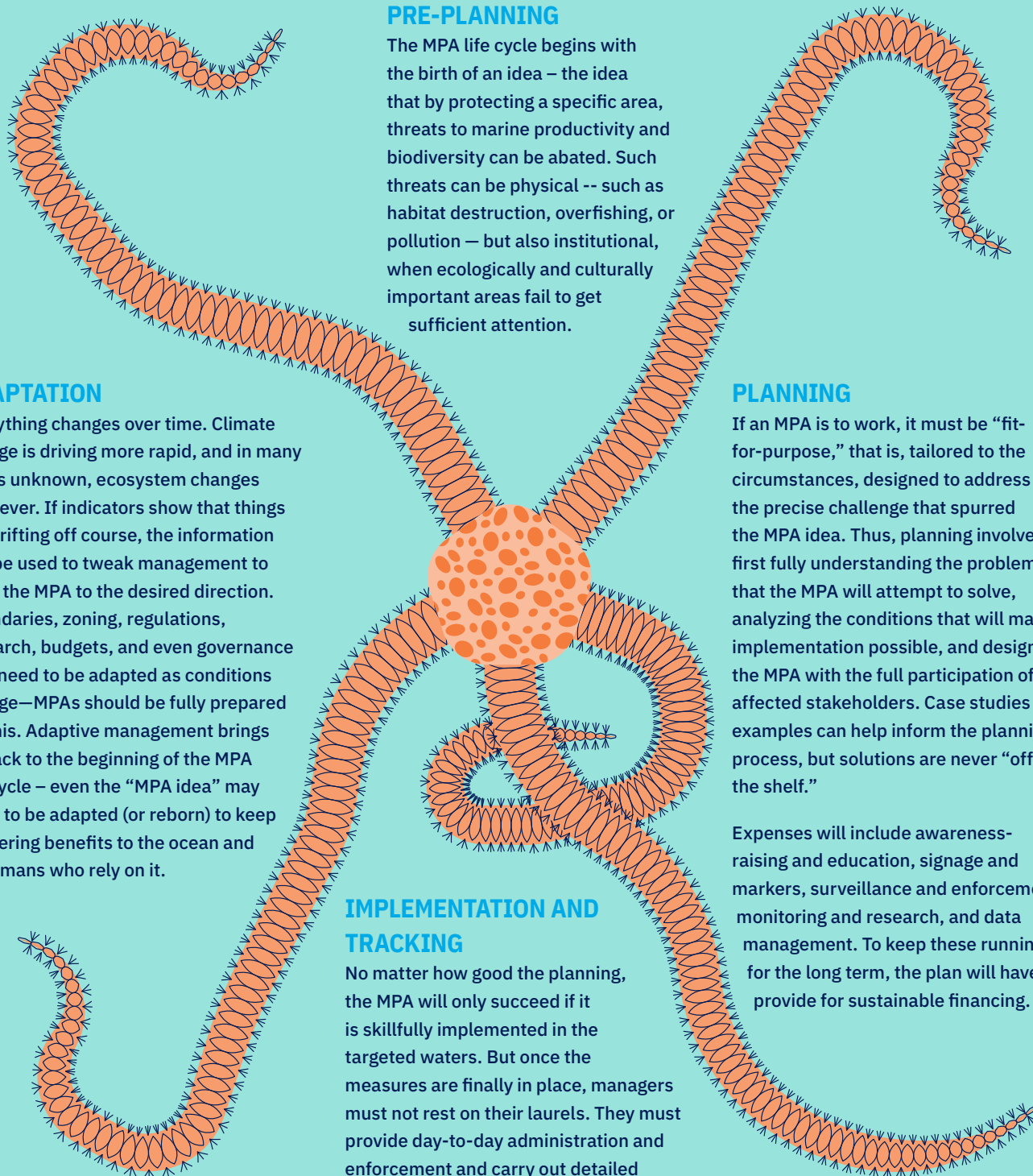
PLANNING

If an MPA is to work, it must be “fit-for-purpose,” that is, tailored to the circumstances, designed to address the precise challenge that spurred the MPA idea. Thus, planning involves first fully understanding the problem that the MPA will attempt to solve, analyzing the conditions that will make implementation possible, and designing the MPA with the full participation of affected stakeholders. Case studies and examples can help inform the planning process, but solutions are never “off the shelf.”

Expenses will include awareness-raising and education, signage and markers, surveillance and enforcement, monitoring and research, and data management. To keep these running for the long term, the plan will have to provide for sustainable financing.

IMPLEMENTATION AND TRACKING

No matter how good the planning, the MPA will only succeed if it is skillfully implemented in the targeted waters. But once the measures are finally in place, managers must not rest on their laurels. They must provide day-to-day administration and enforcement and carry out detailed tracking to see if the goals and objectives (the solution that the “MPA idea” strives to provide) are being met.



THINKING BIG THROUGH MPAs



To date, MPAs have been identified and established in a largely ad hoc and opportunistic manner.

Various agencies and institutions follow their mandates without a big-picture look at how they fit into the picture beyond their regional, sectoral and agency boundaries. But now an integrated, systematic and hierarchical approach to conservation and sustainable use via MPAs is coming into use. It allows countries to address larger geographic scopes and scales of continental marine conservation simultaneously in a more holistic manner.

Goals such as biodiversity conservation, maintenance of ecosystem functioning at a regional scale, management of fisheries, recreation, education, research, and aesthetic needs are beginning to get attention in a more coordinated and complementary fashion. This integrated approach is the best response to a complex set of ecological and environmental problems and efficiently allocates scarce time and resources.

In line with global targets agreed under the CBD, the number of MPAs in the world is increasing rapidly, yet socio-economic benefits that they generate remain difficult to predict and under debate.³³ Some may fail to reach their full potential because of illegal harvesting, regulations that allow detrimental harvesting, or migration of animals to areas outside the boundaries due to poor design or inadequate size of the protected area.

One recent study concluded that the 100 largest MPAs across the globe, accounting for 90 percent of global MPA coverage across 7.3 percent of the global ocean, are unevenly implemented and not particularly effective. In fact, fully a quarter of the studied MPAs were designed but never implemented.³⁴

PHOTO BY DANIAL ABDULLAH

In another study, Edgar et al. analyzed 87 MPAs worldwide. They found that the best results occurred in MPAs that are designed as no-take or restrict all extractive activity, are well enforced, have been established for more than 10 years, are large (greater than 100 km²), and are isolated by deep water or sand.³⁵

In a more recent review, Gill et al. summarized outcomes for no-take MPAs and multiple use MPAs and found that context – particularly regarding whether the area was heavily used – influenced attainment of biodiversity goals.³⁶ This study showed that while no-take areas outperform multiple-use areas in heavily utilized areas, building capacity for management in multiple-use MPAs could show dramatic gains in biodiversity outcomes.

Finally, issues of community buy-in can have deep influence on long-term success or failure. In substantial numbers of MPAs, local people have resisted some forms of management, especially large no-take reserves.³⁷ Failed management strategies can often be traced to an attempt to police

33 Agardy et al. 2003, Mizrahi et al. 2018.

34 Pike et al. 2024.

35 Edgar et al. 2014.

36 Gill et al. 2024.

37 Agardy et al. 2003.

the local community instead of getting it involved in supporting the protected area. This can be especially true when MPAs are viewed as imposed on locals by “outsiders.”

First and foremost, MPA practitioners should recognize that the systems they are managing include people and often unique cultures. Cultural parameters are especially important in areas that have significant populations of Indigenous Peoples with traditional connections to the marine environment. Different perceptions, needs, and ways of knowing need to be factored in. Creating a vision and plan for an MPA and then executing it is best done from the ground up, with as much stakeholder and local participation as possible.

The world’s experience to date establishes that MPAs are not a panacea. But they can bring welcome results if they are carefully planned, sufficient in their coverage, regulations and enforcement, and if possible, embedded in broader planning and management through MSP. Securing fiscal allocation or private finance is key. MPAs must be organized with the big picture in mind.³⁸

By protecting key pockets of biological diversity and ecosystem processes, MPAs can ensure continued delivery of coastal and marine values, nurturing fisheries and minerals, recreation, tourism, and cultural and spiritual heritage. MPAs can act as refugia, insurance policies, and a bank of natural capital through which people can live off the interest.³⁹ They can also enhance production through spillover, increasing value over a wider area. Strategic placement or siting of the areas is crucial.⁴⁰ If the broader context gets no consideration, and management outside the protected area is not effective, the gains for biodiversity may be limited or nil.

To sum up, MPAs can succeed if they have goals derived by participation and consensus; clear, measurable objectives for management; strictly protected zones, and solutions to real threats to ecosystems. Success also results if MPAs are designed to be updated when necessary and if they not only control use and mitigate impact, but raise awareness about the values of the marine area. That awareness is crucial for generating political will to protect marine areas from threats that that MPAs have not traditionally addressed, such as pollution, overfishing, coastal development, and pressures from outside the protected area.

38 Agardy et al. 2011.

39 Vaughan and Agardy 2018.

40 Gill et al. 2024, Parravicini et al. 2013, Frascchetti et al. 2012

OECEMs

WHAT IS AN OECEM?

Beyond MPAs, countries are finding ways to promote conservation through the work of agencies that have mandates other than environmental protection. Decisions by multilateral instruments such as the CBD have often propelled this trend. In 2010, when the Parties to the CBD set a numerical target for protected area coverage, several Parties and stakeholders – including the fisheries community – argued that some area-based measures delivered biodiversity benefits equivalent to those of protected areas, but were not being recognized or counted towards the global target. The CBD COP subsequently introduced a new term for these areas: Other Effective area-based Conservation Measures, or OECEMs. It agreed that they could also be counted toward national and international area-based conservation targets.⁴¹

In 2018, the CBD COP adopted the following definition of OECEMs (CBD COP Decision 14/8):

a geographically defined area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the *in situ* conservation of biodiversity, with associated ecosystem functions and services and, where applicable, cultural, spiritual, socioeconomic, and other locally relevant values (CBD 2018b, paragraph 2).⁴²

Thus OECEM reporting has begun as countries received the green light to include these areas in calculations of protected area coverage targets (previously Aichi Target 11) and currently Target 3 under the Kunming-Montreal Global Biodiversity Framework.

OECEMs cannot be formally reported as marine protected areas and therefore are best seen as complementary to protected areas – an important point as the current worldwide coverage by truly effective protected areas is still in the single digits. To date, few marine OECEMs have been officially reported, but preparation work is underway to report more is underway in many countries, suggesting the numbers will rise.

41 Aichi Biodiversity Target 11, superseded by new targets under the post-2020 Global Biodiversity Framework, as well as the UN Sustainable Development Goals, especially SDG 14 – Life Below Water.

42 CBD 2018b, paragraph 2.

OECMs provide enormous opportunities as countries grapple with how to meet the needs of their citizens while keeping to their international commitments. OECMs can remove some of the burden from environmental agencies and ministries that have been valiantly establishing protected areas and draw other sectors into conservation. Sectoral agencies could well contribute to ocean monitoring by providing financial support for it and adhering to standardized formats for collecting information on biodiversity, anthropogenic impacts, and management effectiveness.

For now, some confusion and disagreement linger in the conservation community on what should count as an OECM. FAO recently presented guidance on this issue for fisheries management,⁴³ which will smooth the process and guard against double-counting or having OECMs substitute for MPAs. The CBD has developed technical criteria for answering the question. Further guidance has come from IUCN. In the meantime, the reality is that countries are declaring OECMs by whatever means they choose.

OECM NET POSITIVE OUTCOMES

The important characteristic of any marine OECM is that its management measures result in lasting net positive biodiversity outcomes for the important biodiversity features of that place. This may lead to questions about what constitutes “important” features, how a net positive effect is calculated, and how long outcomes need to continue to be considered “lasting.” The latter point is especially important as evidence mounts that climate-driven changes threaten to alter the ecology of the global ocean, making maintenance of the ecological *status quo* impossible.

On the point of determining what constitutes important biodiversity features, this is something that protected area planners have been doing for decades, with little disagreement or push-back. An area can be deemed important for biodiversity due to species richness, endemism, vulnerability of the ecological community, linkage to other critical habitats, support to the wider food web/marine ecosystem, or the delivery of valuable ecosystem services (of which biodiversity is a service in and of itself), among other considerations. But not all areas are equally important ecologically, and not all elements of a place necessarily have outstanding biodiversity significance.






This touches on whether single species management measures can be deemed OECM. Ecologically speaking, there is nothing to preclude management of a single species, or even single stock, from leading to a broad biodiversity outcome, if that species or stock has such functional importance to the broader community that its enhancement will have ripple effects. Whether the effect is net positive and durable must still be determined, but single species conservation is clearly recognized as an option in IUCN Category IV MPAs,⁴⁴ so the parallels to OECMs should also be consistent.

43 FAO 2022.

44 Day et al. 2012.

IDENTIFICATION OF EXISTING OECMS AND DESIGN OF NEW OECMS

As 2030 approaches and countries progress toward meeting conservation targets, processes that support the identification of OECMs can also:

-  Raise the bar on MPA assessment, following the lead of the OECM community on clear definitions, criteria for effectiveness, and finding the fine line between global standards and the need to evaluate on a case-by-case basis.
-  Provide guidance on how to implement OECMs in Areas Beyond National Jurisdiction (ABNJ). The role of regional fisheries management organizations (RFMOs) is critical in advancing the agenda of area-based management. Collaborative work requires openness to finding common ground.
-  Endorse a holistic 30x30 vision, including connectivity, which could foster dialogue on the critical roles of both MPAs and OECMs and the best measures to conserve certain biodiversity features. To improve MPA effectiveness, discussions could explore establishing OECMs as buffers around existing MPAs, particularly those at risk from “fishing the line”⁴⁵ or other external pressures.
-  Consider how MPAs and OECMs can catalyze the use of NBS to mitigate against climate change and to reduce risks.
Ensure that both MPAs and OECMs are codified in MSP and that future place-based biodiversity protection is accommodated.
-  Build the constituency and base of knowledge for establishing new OECMs, especially in areas where protected area capacity is limited or where MPAs cause controversy and conflict.

PROTECTED AREA SYSTEMS

Collectively, OECMs and MPAs can achieve conservation and sustainable use goals on wider, regional scales. For optimal outcomes, they should be incorporated into larger-scale marine spatial plans and marine policies. However, even in the absence of intersectoral MSP, networks of area-based conservation remain important to safeguard ecosystems and their biodiversity at large scales. It is therefore imperative that individual OECMs and MPAs be looked at not only as driving positive biodiversity outcomes locally or *in situ*, but also as collectively safeguarding biodiversity and ecosystem values across whole regions.

Networks of MPAs and OECMs can enhance protection of marine and coastal habitats and biodiversity of a large region by sharing cross-cutting conservation initiatives involving common

45 “Fishing the line” refers to fishers operating at the boundaries of protected areas to benefit from the increased productivity spilling over from within the MPA.

ecologies; building regional, national, and international capacity to conserve by sharing lessons learned, new technologies and management strategies, and by increasing access to relevant information.⁴⁶

True networks can be formed by establishing marine protected areas which are physically linked to each other (by physical processes such as currents and hydrology, or by biotic processes such as migration and nutrient loading). However, networks can also be formed by linking people and institutions in a holistic initiative in which everyone has a common goal. Networks can be designed with adaptive management in mind, so that protected areas function to garner more applied ecological information, as well as information about the efficacy of management.

Going forward, international networks could be established to conserve even larger areas and secure the future of national efforts by addressing the broader context in which they exist. International networks could tie together existing MPAs or develop new ones under the rubric of a regional seas agreement such as the Barcelona Convention and Cartagena Convention. But they could also be created bilaterally.

In cases where even strategically planned networks have not led to regional marine conservation, planners have begun to explore the concept of marine corridors. Essentially, a corridor uses a marine protected area network as a starting point and determines through conservation policy analysis which threats to marine ecology and biodiversity cannot be addressed through a spatial management scheme. The connections between the various marine protected areas in a network are thus maintained by policy initiatives or reforms in areas outside the protected areas – still spatially referenced as the context in which the marine protected areas within a network sit, but fundamentally different in the sense that policies are directed less at the fixed benthic and marine habitat and more at the water column and organisms within it. Note that today the vast majority of marine protected areas (with the exception of fisheries reserves) target protection of benthic habitat, with the water column being a corollary beneficiary of protection. Corridors that link MPAs across a wide region, such as the CMAR initiative in the Eastern Tropical Pacific,⁴⁷ provide a way to protect migratory and shared species.

Over time, there has been a shift from developing MPA networks within a single country and corridors across neighboring jurisdictions to stronger cooperation and data-sharing within regional seas. One example is the Regional Seas Convention for the North-East Atlantic (OSPAR), which seeks to develop an ecologically coherent MPA network in the North-East Atlantic.

46 e.g. Wilkinson et al. 2003.

47 Enright et al. 2021.

Generally speaking, creating representative⁴⁸ networks of MPAs as part of an ecosystem based management approach is turning out to bring the best results in protecting the full spectrum of marine ecosystems and vulnerable species.⁴⁹ This shift towards networks can not only help countries achieve Target 3 of the Global Biodiversity Framework but will also contribute to reaching Target 2. Effective, conservation-ready MSP can allow identification of areas of particular importance for biodiversity and ecosystem services (and help fill the knowledge gap), can spur the implementation of MPAs and MPA networks, and can conserve wider areas through effective and equitable management.



THE BROADER CONTEXT: MARINE SPATIAL PLANNING

WHAT IS MSP?

Marine spatial planning (MSP) is a public process aiming at allocating maritime activities within a marine space by minimizing conflicts and maximizing sustainability.⁵⁰ MSP differs from protected areas and related OECM in that it is generally much wider in scope, and does not have conservation as its main objective, but rather seeks to rationalize space allocation among a wide array of sectoral interests. MSP is under development or on track to be implemented in some 80 countries around the world – more than half of the world's countries with territorial waters.⁵¹ MSP has great potential to expand even further under the UNESCO IOC commitment and in the UN Ocean Decade⁵² to support the achievement of global sustainability goals.

MSP allows for rational allocation of ocean space and resources to different stakeholders, often resulting in ocean zoning that is adapted over time to minimize conflicts between users and the impacts of their use on marine biodiversity.⁵³ Through PROBLUE, the World Bank has helped build capacity for MSP by supporting knowledge products, workshops, and structured dialogues.⁵⁴ The World Bank's PROBLUE program has witnessed an increased demand for MSP, rising from three efforts in 2020 to 32 countries today. There are three regional efforts involving multiple Member States.

48 Representation of ecosystems in protected area networks and conservation strategies is a core principle of global conservation priority setting approaches (Sayre, et al. 2020). The idea is to catalogue every type of habitat/ecosystem and ensure that multiple 'copies' of each are safeguarded, so that the broadest possible biodiversity is conserved going forward.

49 Johnson et al. 2014.

50 Frazão Santos et al. 2019.

51 Ehler 2021.

52 Heymans et al. 2020.

53 Agardy 2010.

54 See World Bank MSP work at <https://www.worldbank.org/en/programs/problue/publication/marine-spatial-planning-for-a-resilient-and-inclusive-blue-economy-toolkit>

MSP has some of its roots in marine conservation planning. It is sometimes conceived as a multi-objective approach to balance ecological and socio-economic goals to deliver conservation outcomes.⁵⁵ These include, among others, an increase in species richness and biomass; the maintenance or enhancement of habitat coverage and diversity; more stable food webs; and greater resilience in the face of disturbance and climate change. MSP that rests on the principles of ecosystem-based management (EBM), known as ecosystem-based marine spatial planning (EB-MSP), reflects the interconnected nature of marine ecosystems, with their links to other ecosystems including ones on land and in freshwater. There is great scope to make MSP fully ecosystem-based and conservation-ready⁵⁶ and thereby more effective in reducing biodiversity loss.

MSP AND OCEAN HEALTH

MSP that centers on ocean health puts human needs front and center, since the link between ocean health, thriving Blue Biodiversity, and human well-being is clear. Understanding human needs and the values – both monetary and non-monetary – that they attach to ocean resources and places is key to developing good and fair management.⁵⁷ Ecosystem services assessments will help guide marine planning, as will incorporating social science information. Coming to terms with different ways of knowing and with finding ways to build on traditional and user knowledge will be important.

However, the speed with which cumulative impacts are degrading many marine and coastal ecosystems limits the effectiveness of many conservation strategies. These include widely used tools such as MPAs and OECMs, which though important at the local scale, are not serving to protect interlinked and geographically wider marine systems. The upshot is that substantial investments in management to protect biodiversity and ecosystem services can be wasted, with significant opportunity costs related to public attitudes toward conservation.

To avoid this trap, MSP will need to orient toward improving ocean health, alongside reducing conflict and promoting the growth of the Blue Economy. This means marine planning that explicitly includes restoration of coastal and marine ecosystems. The potential benefits of this approach include ocean recovery, enhanced resilience in the face of climate change and other large-scale phenomena, and maximum socio-ecological and economic benefit-sharing.⁵⁸ MSP can secure opportunities for ecosystem restoration by allowing access across multiple uses, while maintaining or enhancing the full range of ocean values. MSP allows better integration and forward-looking decision making that can reduce conflict and improve efficiency over the long term. To best preserve Blue Biodiversity under an MSP framework, planning needs to consider biodiversity

55 Manea et al. 2023.

56 Reimer et al. 2023A.

57 See, for example, Issifu et al. 2024 on fully incorporating economics in MSP.

58 Manea et al. 2023.

and ecosystem functioning as the inalienable foundation for healthy ecosystems that continue to supply nature's benefits.⁵⁹ For examples of how restoration can be incorporated to promote ocean health and the Blue Economy, see <https://www.decadeonrestoration.org/world-restoration-flagships>.

CLIMATE SMART MSP

Since MSP is by its nature forward-thinking, countries using it will have to consider climate change and manage marine ecosystems to increase resilience in the face of climate-related impacts.⁶⁰ This means not only anticipating shifts in the distribution of species but also impacts associated with warming, sea level rise, changes in current patterns, ocean acidification, faster spread of disease, and in some cases increased pollution as coastal lands become inundated. Triage will likely be necessary to safeguard ecologically important sites that are relatively intact and to restore ones that have become degraded.

The ten components for climate smart MSP provided by Frazao-Santos et al. (2024) give some guidance, including how to identify areas that could serve as harvest refugia in a climate-changed future.⁶¹ Climate smart MSP will involve developing scenarios on species shifts and changes to resource availability, as well as overall ecosystem health, changes in use patterns and access/allocations, and potential changes in types of and intensity of conflicts between different sectors/actors (typically industrial versus small scale or local). Climate smart MSP will also point to priorities for monitoring and research and will help build the knowledge base on Blue Biodiversity.

Effective use of marine planning that incorporates MPAs and OECMs and explicitly catalyzes restoration will bring healthier ecosystems that can better stand up to inevitable climate change. Climate smart MSP will protect investments already made in protected areas and facilitate nature-based solutions for climate change adaptation. A framework that considers climate change while putting restoration on the map (into marine planning) will ensure sustainability and the simultaneous reaching of the multiple targets of the GBF. It will also open the way for integrated management across coastal areas—to include ocean, land, and rivers – much as did Integrated Coastal Zone Management, introduced decades ago for the world's coastal strips. Examples from small island developing states (SIDS) could be informative, since marine planning and management in these places are necessarily holistic (ridges to reefs concept) and since these countries keep climate change impacts front and center in their planning and management.

59 See Ehler 2021, Lombard et al. 2019, and Mahon and Fanning 2019.

60 Frazão-Santos et al. 2016. See also a recent paper in *Science* by Frazão-Santos (2024) calling for climate smart MSP in the Antarctic region.

61 Frazão-Santos et al. 2024B.

GUIDANCE FOR MAINSTREAMING BLUE BIODIVERSITY IN MSP

The World Bank PROBLUE has produced ample guidance on MSP, as well as supporting initiatives that can serve as MSP demonstration projects.⁶² Specific guidelines suggest ways to utilize economic analyses in MSP.⁶³ Rather than reiterating that guidance in those documents, we offer below suggestions of additional measures that could make MSP better able to protect Blue Biodiversity.

1

Consider how MSP can address local needs while driving broader regenerative development. By investing effort in understanding values, it will be possible to connect ocean health goals to local needs and values, supported by different ways of knowing. Ensure monitoring tracks not only ocean health but also stakeholder satisfaction with the planning process. Doing this will ensure that MSP is inclusive and just.⁶⁴

2

Ensure that MSP is ecosystem-based, i.e. considers linkages between land use, freshwater use, and ocean use. This will mean basing MSP on systems science to highlight opportunities for conservation and restoration. It also means that marine planners and managers will have to engage colleagues practicing watershed management and those dealing with land and water use, where applicable. And it means that the range of stakeholders who will need to be invited to co-create marine plans will inevitably be wider than just coastal communities and users of marine space.

3

Design MSP so that biodiversity-positivity is maintained over the long term and ensure that MSP is both climate smart and iterative, adapting to ocean change. Ensure that protected areas (MPAs, OECMs, and specially protected zones in marine plans) are highlighted in marine plans. This can emerge in two ways: (1) when systematic MPA planning⁶⁵ is not incorporated into MSP, look for ways to align the two planning processes (as occurs in Canada, for instance) and (2) where MPA planning is part of MSP, ensure that the full range of MPAs, fit for purpose, are considered, and that social costs and benefits are brought into the planning of protection. Sites for focused active and passive restoration should also appear in marine plans generated by MSP. Since restoration timelines can be long, policies may need to be adjusted as conditions change.

62 World Bank 2022. Marine Spatial Planning for a Resilient and Inclusive Blue Economy Toolkit. <https://www.worldbank.org/en/programs/problue/publication/marine-spatial-planning-for-a-resilient-and-inclusive-blue-economy-toolkit>

63 World Bank. 2022b. "Applying Economic Analyses to Marine Spatial Planning".

64 See Lombard et al. 2022.

65 See, for instance, Ban et al. 2014 on using systematic conservation planning independently from MSP.

4

Use national sustainability frameworks for achieving GBF targets, SDGs, and pledges under the Paris Agreement to identify resources to support MSP and MPA/OECM management. Specifically, the National Biodiversity Strategies and Action Plans (NBSAPs) and Nationally Determined Contributions (NDCs) under the UNFCCC should directly address Blue Biodiversity loss. In this way, planning and co-management will facilitate achievement of multiple GBF and SDG goals simultaneously.

5

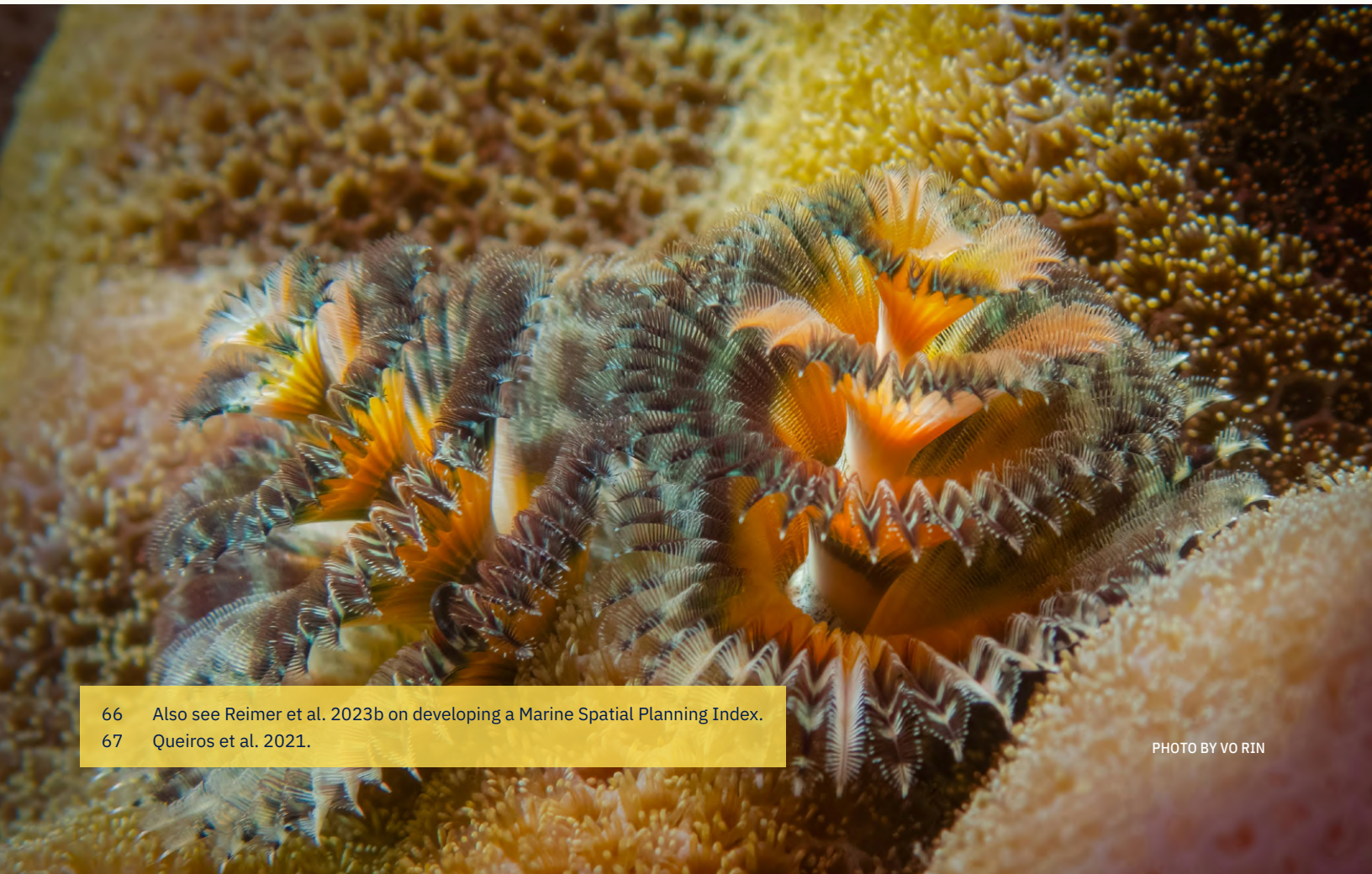
Revisit existing MSP processes to steer them toward ocean health; assess whether outcomes of plan implementation are likely to lead to regenerative development with growth in the Blue Economy alongside restoration and recovery. Be aware of progress and pitfalls⁶⁶ and acknowledge that no one size fits all.⁶⁷ Wherever possible, engage MSP at a variety of scales from local to national and even international, and commit to implementing plans that emerge from MSP in meaningful and impactful ways.

6

Commit to climate smart MSP at the highest level of government, and request that the ministries of finance and planning allocate budgets for monitoring and evaluation, as well as surveillance and enforcement of regulations embodied by marine plans. Where possible, create the multisectoral institutions and regulatory frameworks needed for both the planning and execution of the marine spatial plan.

66 Also see Reimer et al. 2023b on developing a Marine Spatial Planning Index.

67 Queiros et al. 2021.



A BIRD'S EYE VIEW OF BLUE BIODIVERSITY



PHOTO BY POK-RII



BLUE BIODIVERSITY UNDER THE KUNMING- MONTREAL GLOBAL BIODIVERSITY FRAMEWORK

The Kunming-Montreal Agreement of December 2023 resulted in a Global Biodiversity Framework (GBF) that outlines an ambitious and holistic approach to safeguarding biodiversity and maintaining nature's benefits in a fair and equitable way.

There are 23 agreed global targets in the GBF; the first 12 outline a scheme that sets goals for biodiversity in all biomes, while the remaining targets outline approaches or tactics for achieving this.

Virtually all of the 23 targets relates to Blue Biodiversity; to maximize biodiversity outcomes countries can prioritize action in the run-up to 2030 and in the decades beyond. In general, this process entails stock-taking of Blue Biodiversity to understand main drivers of decline site-by-site, prioritizing action in a hierarchical way so that big picture policies can support local needs, and implementing Blue Biodiversity action under existing planning and policy frameworks such as marine spatial planning, protected area planning (or systematic conservation planning), climate change mitigation and adaption approaches, and sectoral management for fisheries, energy development, tourism, and other sectors.



LINKING BLUE BIODIVERSITY TO CLIMATE CHANGE MITIGATION AND ADAPTATION

Climate change and its impacts on human communities through storms, flooding, and sea level rise are top of mind right now, as the world teeters perilously close to a threshold for atmospheric warming. Climate change is also remaking oceans in ways that have until recently been largely overlooked – not just through warming of waters but through acidification.

The link between climate change and Blue Biodiversity must be made more explicit, for at least three important reasons:



First, all recent assessments of biodiversity in the sea point to climate change as a major, if not the major, driver of biodiversity loss. Some decision-makers have taken this to mean there is nothing to be done locally to protect biodiversity, which is untrue.



Second, some of the mitigation measures being launched by countries, including the planting of monospecific mangrove plantations to capture carbon, can actually exacerbate biodiversity loss by promoting monoculture plantings that serve only to maximize carbon uptake and don't serve broader biodiversity functioning, with potentially disastrous consequences.



Third, adaptation measures being considered by coastal countries and communities rely on healthy, functioning ecosystems, which in turn rely on intact Blue Biodiversity.

Therefore, the climate change and biodiversity crises need to be considered simultaneously. Countries should receive support to deal with both holistically.

A strong link between Blue Biodiversity with its relationship to human well-being and climate change comes through interest and investment in Blue Carbon (BC) habitat conservation. Coastal and marine ecosystems across the globe include vegetated habitats that sequester carbon at high rates, making these ecosystems critical components of strategies to mitigate climate change. This potential has been recognized by the World Bank, especially within climate change-focused programs such as its Forest Carbon

Partnership Facility (FCPF), the Climate Change Fund Management Unit (SCCFM), and the Blue Economy Program (PROBLUE). The Bank has provided guidance on ways to ensure that BC meets its full potential (see <https://www.worldbank.org/en/publication/unlocking-blue-carbon-development>).

As climate change mitigation has accelerated, Blue Carbon has entered the market through carbon accounting and accreditation in coastal ecosystems, primarily mangrove forests. Many countries include BC in National Determined Credit (NDC) mitigation strategies.⁶⁸ By some estimates, BC ecosystems sequester carbon at rates many times that of terrestrial forests, yet these important habitats are suffering some of the highest rates of destruction and ecosystem services loss worldwide. Major investment in conservation and restoration is needed to stem the degradation and maximize these ecosystems' potential to help humanity adapt to the coming changes. However, it is important to note that while Blue Carbon is a finance instrument, which usually requires large scale projects, the geographic extent should not limit the integration of BC ecosystems into the seascape agenda being promoted by marine policies and marine spatial plans. Whenever possible, governments should invest or encourage investment (through concessions and incentives) and create the enabling conditions for communities to access markets that complement mangrove management, including developing value chains (such as mangrove honey production and linking this to international markets).



BC projects have been launched in mangrove, seagrass, and saltmarsh habitats in countries in Southeast and South Asia, Africa, and Latin America -- and proposals submitted to the Blue Natural Capital Financing Facility led by IUCN suggest that both the geographic and biome focus of projects are widening. BC projects, however, remain small in scale and cannot meet the demand of public agency and private sector investors looking to offset carbon emissions.

A number of factors set BC apart from terrestrial or forest ecosystems when it comes to sequestering carbon and decision makers' ability to factor in this sequestration in climate change mitigation and adaption strategies, as well as for driving private sector investment. These include ecological considerations, such as (1) the open nature of marine and coastal systems that requires consideration of linked habitats through an ecosystem-based management (EBM) approach, (2) difficulties in determining institutional and biogeographic

68 Including the 28 countries cited in the 2016 appendix to the Herr and Landis 2016 report on Blue Carbon – a number which is expected to significantly increase, since approximately 179 countries harbor BC habitats.

boundaries of some BC habitats and in monitoring landscape/seascape level changes in BC habitats, and (3) the inherent vulnerability of coastal BC habitats to climate change effects such as sea level rise, increased storms, acidification, and deoxygenation.

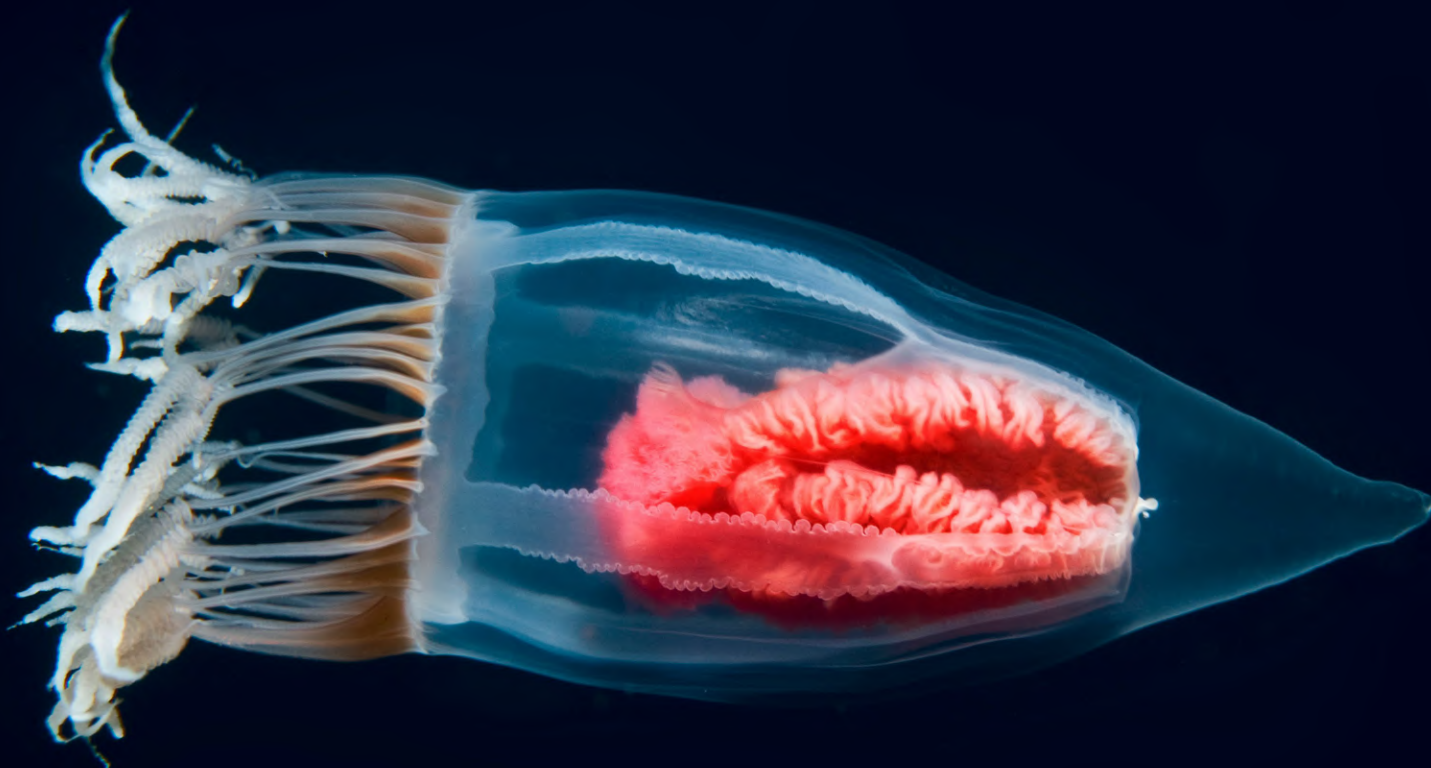


BC also differs from forest carbon in legal and policy dimensions: (1) the absence of private property rights for some BC lands/submerged lands, (2) policy implications of the open nature of marine systems, which require that REDD+ or other potential BC initiatives consider linked habitats in an Ecosystem-Based Management framework, (3) the complexity and expense of BC and other ecosystem services (or co-benefit) assessment, as well as carbon verification and the limited number of certifiers that are up to the task, (4) the inherent difficulty and high cost of monitoring in most BC habitats, (5) decision makers' general lack of understanding about the potential for BC in mitigation and adaptation strategies, and (6) the low value of carbon as compared to the high value of coastal development, especially in the short term.

Despite these ecological and sociopolitical challenges, interest in carbon credit schemes in mangrove, saltmarsh and other peatlands, and - to a lesser extent – seagrasses has been building. Disruptive technologies have created opportunities for large-scale rapid carbon accounting in mangrove forests. Carbon quantification has also spread to other BC habitats, including macroalgae beds and pelagic ecosystems. Offsets in BC ecosystems have become a driver of conservation and restoration of BC habitats, but lack of long-term financial support has been a barrier to bringing BC conservation and restoration activities to scale. For that reason, many existing BC projects have secured deals in which BC is sold at a significant premium over current carbon market rates in order to compensate for high capital costs of design and initial implementation. Still, such projects serve to mitigate climate change, safeguard the many co-benefits provided by BC ecosystems, and bring revenues and political empowerment to coastal communities that participate.

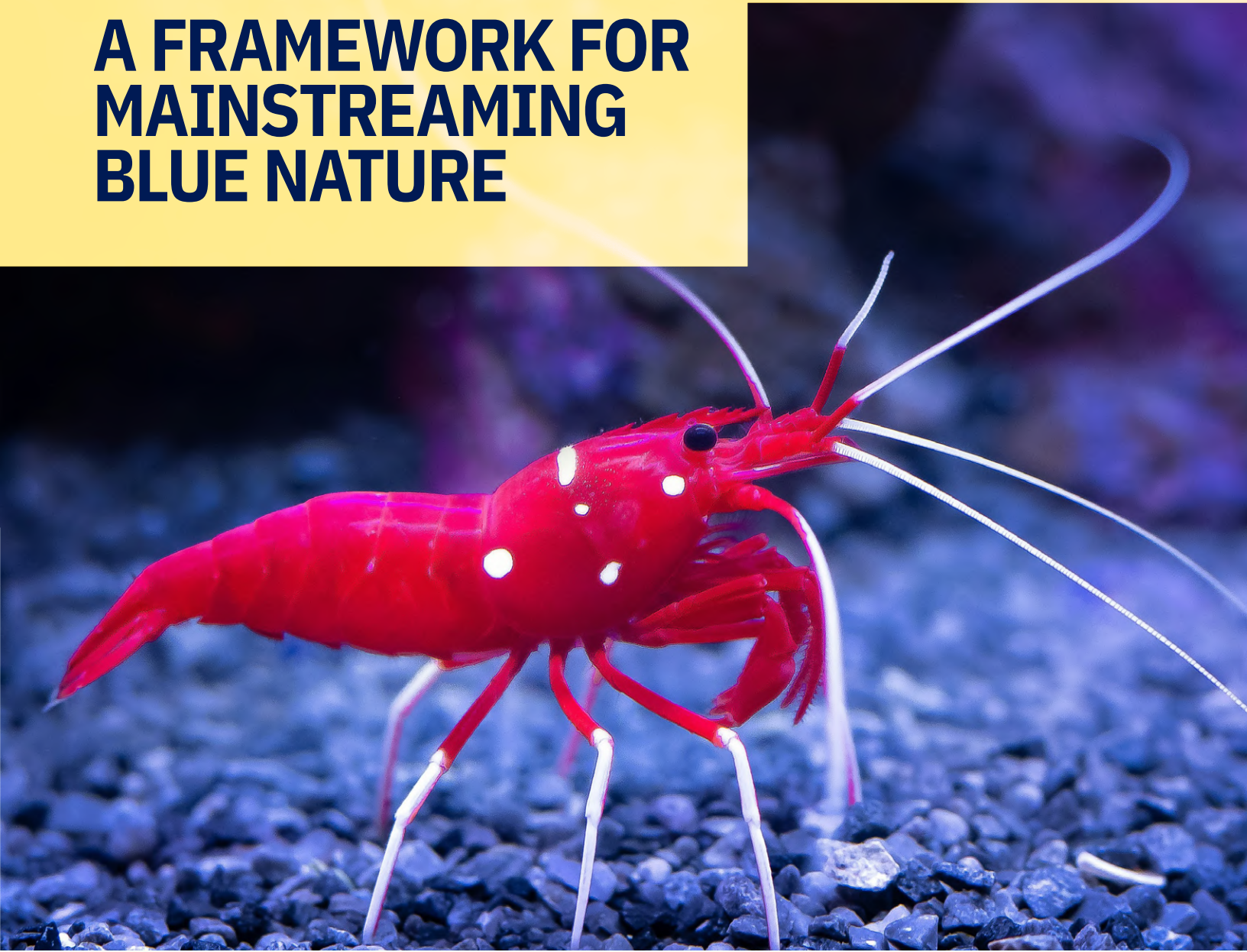
Key demand drivers for BC opportunities fall into two distinct categories: (1) private sector investors seeking BC for carbon sequestration, including impact investors looking for carbon opportunities alongside other environmental/social benefits and corporations searching for carbon credits - specifically BC credits - to meet net zero commitments and for CSR, and (2) governments interested in BC for national accounting (including incorporation of BC in NDCs) as well as for sustainable financing for marine protected areas.

Jurisdictional approaches at national or subnational scales have the potential to drive BC ecosystem conservation and restoration at extremely large scales, but these REDD+ policies and initiatives sometimes come into conflict with smaller-scale projects, particularly if BC policies are not aligned and if revenue streams are coming from different sources. Strategies for effective catalyzation of public and private investments to maximize climate finance to BC ecosystems are needed. So is the linking of BC and other NBS to policies supporting MSP, coastal zone management, fisheries, sustainable tourism development, and trade (including blue biotrade).⁶⁹



69 Agardy et al. 2018. Also see UNCTAD reports and an example from the Caribbean. <https://unctad.org/project/blue-biotrade-promoting-sustainable-livelihoods-and-conservation-marine-biodiversity#:~:text=Blue%20BioTrade%20is%20the%20sustainable,livelihoods%20while%20protecting%20our%20ocean.>

A FRAMEWORK FOR MAINSTREAMING BLUE NATURE



Given recent interest in the Blue Economy and the fate of the ocean in the face of the twin crises of biodiversity loss and climate change, information, advice, and tools have become available in substantial quantities to address specific problems. In this paper, we step back, however, and recommend a holistic, strategic, and imminently doable four-pronged approach to safeguarding the ocean asset base.

The four pillars of this framework are:

PILLAR I.



to fill knowledge gaps in order to better understand marine and coastal biodiversity, its links to the rest of nature, our impacts on Blue Biodiversity, and effective means for mitigating impacts and restoring ocean health;

PILLAR II.



to undertake comprehensive planning, including climate smart marine spatial planning, to protect vulnerable ecosystems through MPAs and OECMs, to sustainably use areas that are not protected, and to promote the recovery of degraded but valuable ecosystems;

PILLAR III.



to identify innovative and diverse financing streams to support research, planning, and ultimately effective marine management; and

PILLAR IV.



to carry plans forward with energetic implementation, dedicating the necessary resources to achieve the desired outcomes, and working with local users and Indigenous People to ensure the fair, just, and equitable distribution of benefits from a thriving ocean and Blue Economy.

A holistic and strategic approach to Blue Biodiversity will need to (1) assess biodiversity in the region and analyze how much investment and in what form is being directed at Blue Biodiversity, with consideration of whether adequate policy and institutional frameworks exist, (2) undertake planning to maintain or enhance biodiversity through co-creation of marine spatial plans, MPAs, and/or OECMs, with investments in strategic restoration, (3) secure blue finance from a variety of sources and across a range of timeframes, and (4) implement resulting measures and adapt them over time. Moving forward with these four pillars as a base will create efficiencies as countries attempt to reach Sustainable Development Goals and GBF targets. The outcome could well be true regenerative development, going beyond a balancing act between conservation and development and preservation of the status quo.

A restoration-centered approach that is driven by the need for increasing human well-being and not just blue growth allows simultaneous progress towards multiple goals. It will advance not only SGD 14 but also SDG 1 (poverty reduction), 2 (food security), 3 (health), and 12 (responsible consumption and production). By putting IPIC front and center, it will bring progress toward 8 (decent work), 10 (reduced inequalities), 5 (gender equity), and 13 (climate action). With the organizing framework of sustaining ocean health and biodiversity to sustain human life, efficiencies can be reached using existing policies and initiatives – rather than having to craft entirely new policies. This could involve (1) identifying synergies between existing policies that drive movement toward various GBF targets – particularly coupling restoration to marine and watershed management, as well as to sustainable use policies, and (2) grounding policies in communities to grow support for them and to increase the likelihood of sustained positive outcomes.



I. ASSESSING BLUE BIODIVERSITY TO ESTABLISH PRIORITIES

Knowledge gaps remain about coastal and marine biodiversity, with many new species still to be discovered.

These gaps relate to the distribution and status of marine biodiversity, the functioning of ecosystems, and the means by which they furnish goods and services. What makes certain species and ecosystems more resilient to cumulative pressures, and when and how tipping points occur, are also poorly understood. Addressing these knowledge gaps is critical to support the design and implementation of management measures for controlling biodiversity loss, and to achieve the WBG's vision and mission, and the targets of the post-2020 Global Biodiversity Framework (GBF).

It is critical that this biodiversity research and knowledge generation are inclusive and representative. In a recent review paper, Valdez and colleagues point to linguistic bias, undervalued contributions, parachute science, and capacity constraints in underrepresented countries and communities.⁷⁰ To address these shortcomings, they suggest that funders of biodiversity research must remove barriers to participation by researchers unaffiliated with big, well-known institutions, strengthen research networks, and prioritize equitable resource allocation. As knowledge about Blue Biodiversity expands, incorporating it into marine planning and management and conducting strategic assessments will become easier.

70 Valdez et al. 2024.



II. STRENGTHENING INSTITUTIONAL FRAMEWORKS FOR SAFEGUARDING BLUE BIODIVERSITY

One of the fundamental reasons for marine biodiversity loss to date has been a piecemeal approach to marine management.

Stand-alone attention to legislation, regulation, and management has resulted in weakened ecological functioning. Conservation planners design MPAs on a solo track, neglecting the context in which these islands of potential protection sit – including the temporal context and how climate change will hinder biodiversity and ecosystem services. The lack of integration prevents understanding of trade-offs, can pit one maritime sector against another, increases conflict, and creates vast and costly inefficiencies.

Marine plans that capture connectivity and strategically manage linked land, sea, and freshwater are the most likely to return dividends. These include Ridges to Reefs-type initiatives integrating land and sea. The UNEP Global Program of Action for Land-Based Sources of Pollutants (known by the shorthand GPA) is one good example of how such land and sea integration has become a basis for international negotiation and eventual codification. Many NGOs have built this sort of integration into their coastal or island restoration projects, including many financed by the GEF. The United States has linked terrestrial and watershed management with marine management in an initiative called “White Water to Blue Water.”

In addition to addressing biodiversity loss at the seascape/landscape scale and integrating across all sectors, MSP must be conservation ready,⁷¹ climate smart,⁷² and restoration-inclusive.⁷³ Stakeholder engagement is crucial in co-creating, implementing, and monitoring plan success, including in choosing key performance indicators and monitoring whether needs, especially those of IPLc, are being met. Ultimately, this engagement promotes biodiversity, ecosystem services, and human well-being.

71 Reimer et al. 2020.

72 See papers by Frazao-Santos et al. 2020, 2023, 2024A.

73 Manea et al. 2023.



III. FINANCING BLUE NATURE

Marine planning and management can be expensive, even in an investment that down the road will bring lasting returns in the form of ocean health and human well-being. Financing the planning, and especially the operations, of MPAs and OECMs is a major challenge around the world and has emerged as a priority in many global forums. Measures to protect biodiversity at even larger scales, such as a national-level MSP or a regional marine planning (such as the Arctic Council and Antarctic through CCAMLR), face even greater financial challenges.

A huge and growing gap exists in conservation finance generally; marine conservation is even more chronically underfunded.⁷⁴ According to the High-Level Panel on the Sustainable Ocean Economy, investments are not yet driving a sustainable ocean economy, with less than 1 percent of the total value of the ocean invested in sustainable projects by philanthropy and official development aid.⁷⁵

At the same time, more financing tools have gone online. Blue satellite accounts can highlight current private and public investments, associated jobs, and tax reforms. They can help identify where to tap subsidies and mobilize finance for biodiversity. Once opportunities are identified, financing can be harnessed from a wide range of instruments.

CATEGORIES OF BLUE FINANCING

The World Bank Group categorizes the universe of financing as policy-related, including taxes, fees, and subsidies, as well as debt and non-debt instruments (Figure 5). Examples in the marine context are shown in Table 1 .

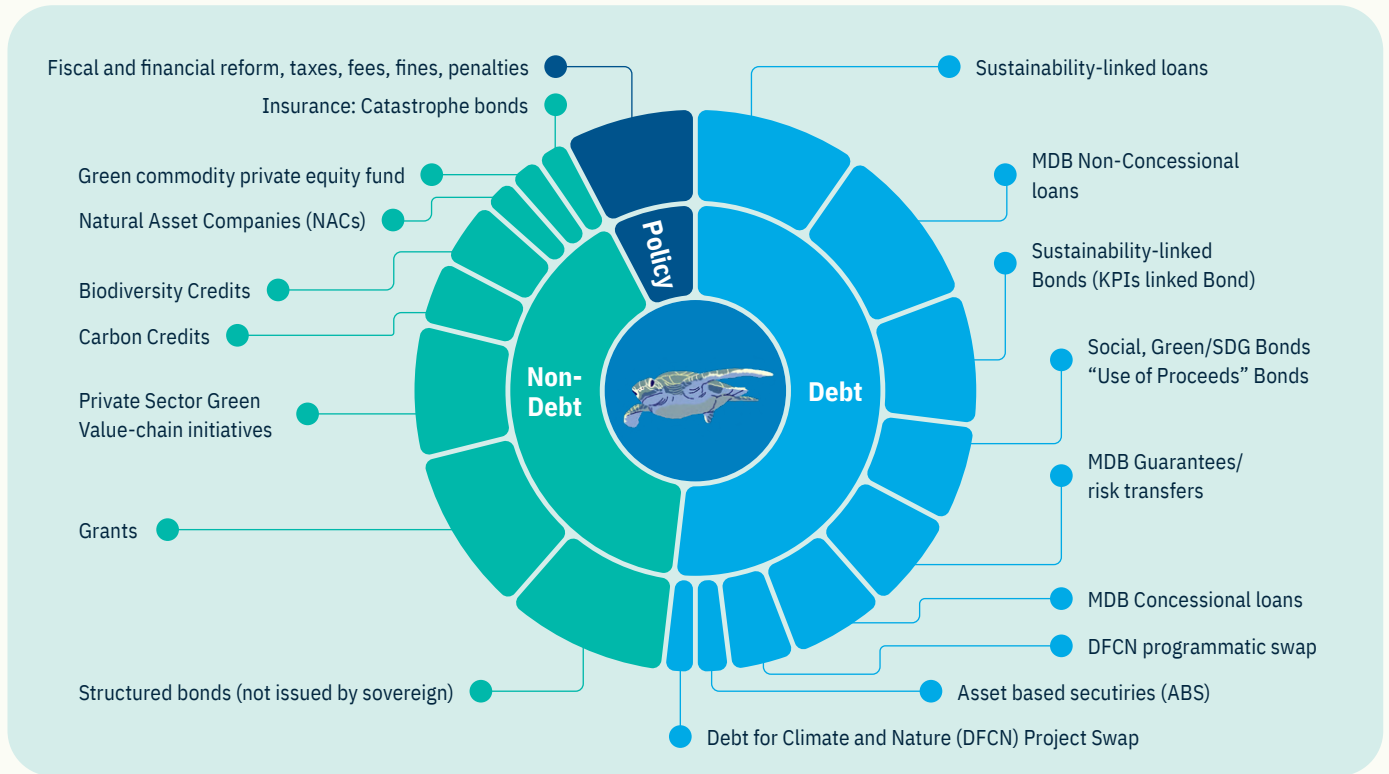
74 See Walsh 2017 and CEA.

75 Sumaila et al. 2020.





FIGURE 5. SAMPLE POLICY, DEBT AND NON-DEBT INSTRUMENTS FOR BLUE BIODIVERSITY FINANCING



SOURCE: WORLD BANK GROUP.



TABLE 1. BLUE BIODIVERSITY FINANCING, WITH EXAMPLES

INSTRUMENTS	EXPLANATION AND EXAMPLES
MDB grants and concessional loans	Currently 75 countries are eligible to receive resources from the <u>International Development Association</u> , More than half of IDA countries receive all or part of their IDA resources as grants, which require no repayments. The remaining resources are provided as low-interest loans, targeted at developing countries with a higher risk of debt distress.
MDB non-concessional loans	In addition to concessional loans, the World Bank Group and other MDBs dispense non-concessional funding for development to low- and middle-income countries. MDBs possess great potential to lead in biodiversity finance: they have capital at their disposal and can raise additional money through international markets.
MDB risk transfers	The <u>Catastrophe Deferred Draw Option (Cat-DDO)</u> instruments from the World Bank transfer risk to provide immediate liquidity following natural disasters, allowing for recovery and ecological restoration. Some <u>disaster risk transactions</u> , for instance those insuring against tropical cyclones, can cover biodiversity in coastal ecosystems.

INSTRUMENTS	EXPLANATION AND EXAMPLES
Blue Bonds	The Seychelles issued the first sovereign blue bond ; additional blue bonds have been issued by the International Finance Corporation including in Ecuador and Thailand .
Outcome bonds	The Indonesia Coral Bond is the world's first blue outcome bond, modelled after the first of its kind outcome bond for rhinoceros conservation, known as the Rhino Bond .
Insurance	The first parametric insurance to protect coral reefs was launched in 2018 by the Green Finance Institute to safeguard the Mesoamerican reef in Mexico . COAST is a parametric small scale fishers disaster risk insurance for Grenada, Saint Lucia and Saint Vincent and the Grenadines. The weather index-based Philippines parametric insurance covers coral reef systems that support the livelihoods of small-scale fishers.
Debt-for-Nature Swaps	The government of Barbados completed a debt conversion for nature swap backed by the IDB and TNC (Barbados debt for nature). Other swaps for Blue Biodiversity have been done in Belize and Ecuador (Galapagos).
Grants	Most biodiversity investments (on land, coasts, or in the sea) are grant-financed. GEF, PROBLUE, and other MDB initiatives have specific dedicated Trust Funds for biodiversity protection. Philanthropic organizations also provide grants for protecting Blue Biodiversity.
Offsets (biodiversity/ carbon credit)	Markets to offset carbon emissions or unavoidable biodiversity loss during development are expanding for both blue carbon credits and biodiversity credits/certifications. These take many forms, but a particularly good example is the Mozambique biodiversity offset initiative supported by the BioFund.
Marine PES	The Costa Rican parliament recently passed a Costa Rica policy that creates a fund to incentivize the protection of coastal and marine biodiversity through PMES, making it a pioneering example of PES in the marine environment.
Private sector green/blue value chain initiatives	There are innumerable examples of value chains capturing biodiversity benefits and using profits to further protect biodiversity. One example is the Wave of Change Innovation Hub , through which Iberostar Hotels established a Coastal Health Program to finance reef, mangrove, and dune restoration. Other value chain initiatives center on commodity production, such as mangrove honey in Thailand , in which 10% of the honey profits are invested back into a community conservation fund to support mangrove protection efforts and environmental initiatives collectively chosen by community members.



INNOVATIVE BONDS

On the heels of the pioneering Sovereign Blue Bond developed by Seychelles in partnership with the WBG and the GEF in 2018, bonds are being used in creative ways to finance Blue Biodiversity protection and restoration. One exciting new development is the use of an outcome bond to pay for long-term marine protection, currently being trialed in Indonesia. This bond builds on previous PROBLUE capacity building, in which US\$210 million provided by the World Bank led to 32 million ha of ocean area being put into fully operational MPAs. These new instruments bring new funds flows to projects and places where support is badly needed.



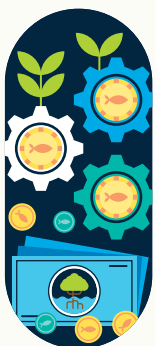
PRIVATE SECTOR INVOLVEMENT

The private sector is vital to catalyzing blue finance, driving risk reduction strategies, and providing data and analytics on potential returns on investment that could bring its own investment to scale. Blue-invested companies such as Iberostar Hotels are going beyond corporate ESG to drive circular economy and ecosystem restoration. Ecotourism operators act as co-managers of ecologically important and valuable marine real estate and launch projects for conservation and restoration either independently or through blended finance. The scuba diving sector is particularly invested in this sort of value chain-related financing of conservation.⁷⁶ New instruments such as outcome bonds reduce risk for the private sector, opening up avenues for its expanded involvement in marine conservation and sustainable use.



PARAMETRIC INSURANCE

Parametric insurance schemes are being considered in coral reefs and other ecosystems where climate change and other natural disasters threaten biodiversity, livelihoods, and infrastructure. PROBLUE has published [“An Impact Story on Innovative Fisheries Insurance: Making the Fisheries Sector in the Caribbean Resilient to Climate Events.”](#) The World Bank, together with the CCRIF SPC, developed the first-ever parametric insurance product specifically for fisherfolk, labelled the Caribbean Oceans and Aquaculture Sustainability Facility (COAST). The program delivers funds to fishers in the wake of climate disasters.



TRUST FUNDS

Trust funds remain an important tool for supporting the development of financing plans, providing seed money for blended finance start-ups or allowing small-scale financing to expand. PROBLUE is a leading example of such a trust fund, in addition to helping to steer World Bank loans toward truly sustainable blue projects. PROBLUE has a portfolio of US\$182 million in support of activities in more than 100 economies. It has been instrumental in helping the World Bank Group’s Blue Economy portfolio expand from US\$5.3 billion in fiscal year 2018 to over \$10 billion in fiscal year

76 Arcos-Aguilar et al. 2021.

2024. This growth underscores the effectiveness of PROBLUE in integrating the Blue Economy framework throughout the World Bank's operations.

A progressive and as yet untested model of a trust is the common asset trust for blue commons, put forward by Hernandez and colleagues.⁷⁷ It would create revenue streams for biodiversity beyond national jurisdictions (BBNJ), as well as for species that move freely between jurisdictions and across blue commons.

In these many ways, Blue finance is growing by leaps and bounds. Innovative financing instruments are being trialed and tested to reduce social risks and ensure equity along with ecological and economic sustainability.⁷⁸ Financial security for spatial management can be accomplished through grants, loans, and government agency programs, whereas the continued management and adaptation of management of MPAs, OECMs, and special ocean zones that emerge from MSP may be better supported by user fees, marine PES, and other market-based financing.



IV. IMPLEMENTING BLUE BIODIVERSITY ACTIONS

Building on the World Bank's Blue Economy approach and the 30x30 commitment under the GBF, there are many other opportunities for mainstreaming Blue Biodiversity.

To implement Blue Biodiversity protection, actions need to include equitable and inclusive participation and rights for Indigenous Peoples and local communities, women, youth, and other underrepresented people. They need to achieve true integration of uses and interests in the common agenda of creating ocean health. Actions to facilitate positive biodiversity outcomes can be short-, medium-, and long-term. Some potential actions are given below, though this list is by no means comprehensive.

⁷⁷ Hernandez-Blanco et al. 2023 outline a blue commons trust, modelled on the common asset trust first proposed by Costanza et al. 2020.

⁷⁸ Schutter et al. 2024.

ACTION MENU FOR SAFEGUARDING BLUE BIODIVERSITY



PHOTO BY MICHAL B. ON UNSPLASH

While this report does not intend to be prescriptive, the World Bank and its partners are now able to highlight a broad and varied menu of options available to countries to take steps to secure Blue Biodiversity within their borders, and to work together to safeguard shared resources and the global ocean. The following menu highlights short-, medium-, and long-term actions.

ST SHORT-TERM MEASURES:

- Identifying the biggest opportunities to strengthen sectoral management to make it inherently biodiversity-positive. These opportunities could lie in new MPAs, in new zoning under national, regional, or local marine plans, or in marine management (for example, in OECMs). Taking simple steps to strengthen existing management could improve integrated management and introduce economic efficiencies, as well as help countries meet targets under GBF/SDGs.
- Doing a stocktaking of sector concessions soon expiring or coming up for renewal, to flag opportunities for revising contracts to make development biodiversity-positive. This action ties licensing to spatial management so as to catalyze restoration, and allows the sharing of financial burden with the private sector.
- Conducting a quick assessment of Public Expenditure Reviews for coastal-marine government agencies to identify budgetary reallocations for Blue Biodiversity management and investments in MPAs, OECMs, and other area-based management.
- Launching partnerships with academic and research institutions, NGOs, and private sector/philanthropist institutions to access information and catalyze analysis that establishes priorities and underlies solid strategies for biodiversity-positive use. This includes knowledge about fisheries management to improve the resilience of marine ecosystems in the face of climate change.⁷⁹ Such information sharing strengthens the knowledge base for spatial management, making measures more tailored and efficient.
- Replicating/designing citizen science programs (including with such groups as local communities, fishers, and schools) to inform current understanding of marine biodiversity and support the development and implementation of spatial management and co-management. This will act to empower local communities and build knowledge with different ways of knowing.⁸⁰

79 Sumaila and Tai 2020.

80 Or two-eyed seeing, as aptly coined in Reid et al. 2021.





MT MEDIUM-TERM MEASURES:

- Doing a priority-setting exercise to identify the ecologically most important habitats within a country's estate, with an eye to creating MPAs or designing restoration plans for these areas.
- With ecological priorities identified, developing restoration plans that utilize all steps in the restoration continuum, and that harness financing available for each step.
- Undertaking integrated MSP to grow the Blue Economy while simultaneously protecting Blue Biodiversity. Where MSP is already underway or completed, find ways to amend plans to include biodiversity-positive actions in all place-based management.
- Developing Ocean/Blue Satellite accounts to evaluate and guide allocations of fiscal and private resources for blue nature-positive projects and inform initiatives to enhance access to capacity building and formal employment in the most promising traditional and emerging sectors of the Blue Economy.
- Creating institutional arrangements to mainstream marine biodiversity policies and investments across sectors.

LT LONG-TERM MEASURES:

- Developing policies that require restoration of habitats/ ecosystem processes in all Blue Economy development, to allow regenerative development. These policies could be tied to permitting and concessions and financing through multilateral loans as well as PPP investments, and could be embedded in marine plans coming out of MSP.
- Launching a Blue Economy finance strategy (policy, debt, and non-debt instruments) that embeds Blue Biodiversity investments, and management actions.
- Establishing long-term monitoring programs to inform management and allow for truly efficient adaptive management. This might be best accomplished through partnerships, sometimes at a regional scale.
- Partnering with countries within a region (especially semi-enclosed seas or other clearly defined regions where strong cooperative frameworks exist) to address regional priorities for Blue Biodiversity conservation and shared resources.

FRAMEWORKS TO SUPPORT ACTIONS



Countries that recognize the immense value of Blue Biodiversity now have three important frameworks through which they can systematically plan and implement spatial management to safeguard and enhance these values.

These are (1) the development of NBSAPs that strategically support MPAs and OECMs and link spatial plans and MSP with other non-spatial conservation measures, (2) the incorporation of biodiversity protection in NDCs, recognizing that all Blue Carbon ecosystems also support important Blue Biodiversity, and effective protection and restoration of these habitats will therefore enhance biodiversity and associated ecosystem services, and (3) a focus on MSP and protected priority areas within the National Development Plans that guide MDB investment.

REVISED NBSAPs

Spurred by the ambitious Kunming-Montreal Global Biodiversity Framework,⁸¹ countries around the world are creating strategies to protect biodiversity and simultaneously securing funding to carry out strategic actions.

The CBD has been providing technical advice for systematically addressing the multiple targets under the GBF, and in particular guides the development of amended and updated National Biodiversity Strategies (NBSAPs).⁸² These plans are the main vehicle for implementing the CBD at the national level, and with the expanded ambitions of the GBF, Member States must find ways to align their national efforts with these many targets. Regarding Blue Biodiversity, this means not only expanding marine protected areas and OECMs (GBF Target 3) and expanding land and sea area under restoration (GBF Target 2), but also ensuring that resource and wildlife use is sustainable (GBF Targets 4, 5, 9, and 10). The NBSAPs are an umbrella under which all national targets and actions relevant to the GBF can be planned, monitored, reported, and reviewed.⁸³

Amendments to national strategies to better catalyze the protection and enhancement of Blue Biodiversity can include establishment of MPAs and/or OECMs to protect particularly biodiverse, vulnerable, or sensitive ecosystems. The amendments can also fill gaps in MPA networks with an aim to maximize representativity and maintain ecological connections. In addition, or alternatively to designating new protected areas, countries can commit to MSP that puts nature-based solutions and the conservation of the ecologically most critical places as a prerequisite to development.

In line with all of the GBF's goals and targets, a Blue Biodiversity-positive NBSAP should promote equity, the inclusion of stakeholders and minorities in planning, management, and decision-making, and ensure that benefits from biodiversity flow to those most dependent on it and those most able to practice stewardship of ocean areas.

81 CBD 2022.

82 CBD Member States are being encouraged to submit NBSAPs by COP 16, 21 October to 1 November 2024, Cali Colombia <https://www.cbd.int/nbsap/post-cop15.shtml>

83 Annex I Guidance for revising or updating national biodiversity strategies and action plans to align with the Kunming-Montreal Global Biodiversity Framework ([https://www.cbd.int/doc/nbsap/Annex%201%20\(NBSAP%20guidance\).pdf](https://www.cbd.int/doc/nbsap/Annex%201%20(NBSAP%20guidance).pdf))

REVISED NDCs

Further opportunities to use existing platforms to promote Blue Biodiversity conservation include climate change adaptation and mitigation measures. Under the UNFCCC, Nationally Determined Contributions (NDCs) to mitigating climate change could well include more Blue Carbon ecosystems. Furthermore, as guided by ecosystem-based management principles, the protection of Blue Carbon ecosystems will often require biodiversity conservation in ecologically linked habitats outside of those ecosystems. For example, if mangrove forests in estuaries and adjacent coasts are included in NDCs, revised strategies aiming to protect riverine systems that deliver sediment, nutrients, and freshwater to estuaries could provide a dual solution to the climate change and biodiversity crises.

AMENDED NDPs



PHOTO BY WILLIAM WARBY ON UNSPLASH

National Development Plans (NDPs) are pivotal to the World Bank Group's programs, with biodiversity conservation as an important objective. To effectively halt biodiversity loss, economic decisions must reflect the intrinsic value of nature.

The World Bank is committed to assisting countries in incorporating natural elements into their models of economic growth, development strategies, and climate-related agendas. This involves the formulation of policies that acknowledge the true economic worth of nature, the establishment of institutions that advocate for natural conservation, the creation of public-private partnerships aimed at this objective, and the procurement of financial resources from diverse sources. This approach aims to transcend sporadic efforts by transforming economies and policies comprehensively.

NDPs constitute the framework of a country's developmental aspirations.

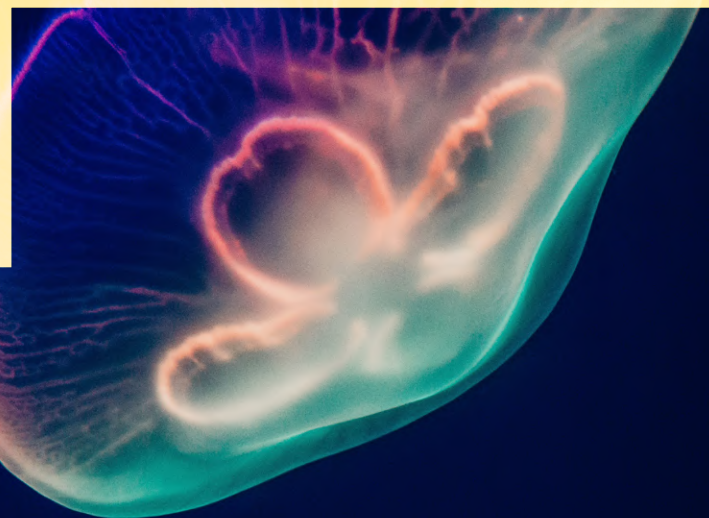
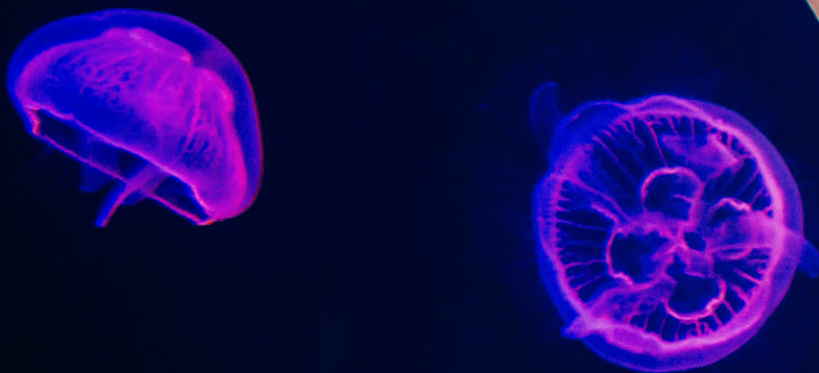
They serve as the primary reference for international donors and financial institutions to set up partnership frameworks that direct funding priorities within each country. Prior to the development of NDPs, a range of analytical work was undertaken to define priorities. The World Bank Group, along with other international entities, is closely involved in initiatives to help countries recognize the significance of nature and the potential perils of its loss. These organizations often collaborate with finance ministries to provide funds, knowledge, policy guidance, and technical expertise, thereby rallying partners around innovative interventions that hold the potential for replication and expansion.

Inputs to NDPs include investments in nature-based solutions that not only conserve nature but bolster economic growth, create jobs, and support countries in their efforts to respond to climate change. Take mangroves, for example: they are biodiversity hotspots, serve as breeding grounds for fish, shield more than six million people from annual flooding, and sequester carbon emissions. Their economic value is estimated at US\$550 billion. Another example is the creation of Blue Economy satellite accounts, which measure the contribution of Blue Economy sectors to overall domestic output and track the supply of Blue Economy goods to other industries. Such inter-industry analyses can guide policymakers by highlighting potential demand surges in various industries from efforts to boost final demand within the Blue Economy.

In recent times, NDPs have increasingly integrated environmental indicators. For example, the latest Colombian National Development Plan sets a vision for the country to emerge as a champion in safeguarding life. It is founded on establishing a new social contract that fosters the rectification of historical injustices and exclusions, ensures non-recurrence of conflict, redefines human interaction with the environment, and promotes a productive shift that is knowledge-based and eco-friendly. In the Colombian plan, three themes are prominent: environmental sustainability, territorial planning, and social policy. Under the umbrella of environmental sustainability, and in light of climate change, the plan endorses initiatives to curb deforestation and safeguard biodiversity and strategic areas such as the Pacific coast. It envisions a productive transformation that makes biodiversity even more diverse, leverages natural capital, and speeds the adoption of clean energy solutions that are driven by knowledge and innovation, ultimately putting a brake on environmental degradation.

CONCLUSIONS

PHOTO BY IRINA IRISER ON UNSPLASH



Transformative actions to halt, and indeed reverse, Blue Biodiversity loss for the benefit of people and nature are at hand. They will ensure that humans will continue to derive benefits from a healthy, functioning ocean, and that its healthy ecosystems will continue to support planetary processes upon which all life on Earth depends.

While there are many activities, initiatives, and policies that can safeguard Blue Biodiversity and the myriad benefits flowing from blue nature, this report focuses on cost-effective and practical spatial management measures that will ensure that development is truly sustainable. A framework for maintaining and enhancing blue diversity is presented. This framework first describes the importance of broadening understanding of Blue Biodiversity through data and analytics and by looking to examples where Blue Biodiversity is well understood through scientific study and local knowledge. The other pillars of the recommended framework are spatial planning to identify priorities for conservation and protection, sustainable financing to support the biodiversity-positive management of marine areas, and effective implementation of marine spatial plans, including MPAs and OECMs.

To accomplish this planning and implementation, three major classes of spatial management are described. These are (1) the full variety of fit-for-purpose MPAs, (2) more focused, deliberate actions to ensure that sectoral management yields biodiversity-positive outcomes in OECMs, (3) and broader frameworks for allocating space and resources through ecosystem-based, climate smart MSP. Applying these approaches will stem biodiversity loss – and act to kickstart restoration of degraded systems and natural recovery, with all the pluses for human well-being that come with healthy blue nature.

The report also presents recommended actions that can be taken in the short, medium, and long terms to safeguard Blue Biodiversity and ocean values. This menu of options is not comprehensive but signals the types of policy amendments, legislation, contract conditions, and other measures that are most likely to deliver biodiversity benefits. Some of these actions derive from case studies and lessons learned, others are innovative and have not yet been trialed. Planners, managers, and decision-makers in both government and coastal communities can identify which of these or other options are suitable for the challenges of Blue Biodiversity loss in their regions.

Finally, this report recognizes three major frameworks that can catalyze strategies and support priority actions. These are (1) fully considering Blue Biodiversity in NBSAPs, (2) extending inclusion of Blue Carbon ecosystems in NDCs based on their support of Blue Biodiversity, and (3) fully mainstreaming Blue Biodiversity into national development and action plans.

It is important to reiterate that Marine Protected Areas (MPAs) and OECMs and effective MSP across broader regions can aid Blue Biodiversity recovery, and that these tools fully align with the Blue Economy approach. In other words, protecting Blue Biodiversity need not impede development, and will only act to improve human well-being. Furthermore, using MPAs and OECMs to stem biodiversity loss will better respect and engage those who are most reliant on the ocean, including marine rights holders, Indigenous peoples and local communities, and government agencies, as well as sectoral actors, private organizations, and individuals.

Marine spatial planning can serve to grow the Blue Economy and minimize conflict, while ensuring that the resource base and ecosystems that deliver values continue to thrive. What flows from such an approach is lasting Blue Biodiversity, for the benefit of all.

SOURCES

- Agardy, T. 1997. "Marine Protected Areas: Making Marine Management More Effective." Sinauer & Associates.
- Agardy, T. 2010. "Ocean Zoning: Making Marine Management More Effective." Earthscan Books, London.
- Agardy, T., et al. 2011. "Taking Steps Toward Marine and Coastal Ecosystem-Based Management: An Introductory Guide." UNEP: Nairobi 67 pp.
- Agardy, T., G. Notarbartolo di Sciara, and P. Christie. 2011. "Mind the gap: Addressing the shortcomings of marine protected areas through large scale marine spatial planning." *Marine Policy* 35 (2): 226-232.
- Agardy, T., et al. 2003. "Dangerous targets: Differing perspectives, unresolved issues, and ideological clashes regarding marine protected areas." *Aquatic Conservation: Marine and Freshwater Ecosystems* 13:1-15.
- Agardy, T., et al. 2018. "Blue Biotrade." UNCTAD Report UNCTAD/DITC/TED/2018/11 Geneva.
- Arcos-Aguilar, R., et al. 2021. "Diving Tourism in Mexico – Economic and Conservation Importance." *Marine Policy* 126 (April):104410. <https://doi.org/10.1016/j.marpol.2021.104410>
- Ban, N., et al. 2014. "Systematic conservation planning: A better recipe for managing the high seas for biodiversity conservation and sustainable use." *Conservation Letters*, 7(1), 41–54.
- Blue Food Assessment. 2021. "Building Blue Food Futures for People and the Planet -The Report of the Blue Food Assessment." <https://bluefood.earth/policy/>
- Boonzaier, L., and D. Pauly. 2016. "Marine protection targets: An updated assessment of global progress." *Oryx*, 50: 27–35.
- Brown, K., et al. 2001. "Trade-off analysis for marine protected area management." *Ecological Economics* 37:417-434.
- Burke, L. et al. 2011. Reefs at Risk, Revisited. World Resources Institute. http://pdf.wri.org/reefs_at_risk_revisited.pdf
- CBD. 2022. Kunming-Montreal Global Biodiversity Framework. Decision 15/4 Adopted by the Conference of Parties of the Convention on Biological Diversity. CBD/COP/DEC 15.4 9 December 2022.
- Costanza, R., et al. 2020. "Common asset trusts to effectively steward natural capital and ecosystem services at multiple scales." *Journal of Environmental Management*, 280, 111801.
- Davison, S., et al. 2023. "Concern about the human health implications of marine biodiversity loss is higher among less educated and poorer citizens: Results from a 14-country study in Europe." *Frontiers in Marine Science*. 10:949263 doi: 10.3389/fmars.2023.949263.
- Day, J., et al. 2012. "Guidelines for applying the IUCN Protected Area Management Categories to MPAs." IUCN. Gland, Switzerland.
- De Fontaubert, C, D. Downes, and T. Agardy. 1996. "Biodiversity in the Seas: Protecting Marine and Coastal Biodiversity and Living Resources Under the Convention on Biological Diversity." Island Press, Washington, DC.
- Díaz, S., et al. 2006. "Biodiversity loss threatens human well-being." *PLoS Biology*. Aug;4(8):e277. doi: 10.1371/journal.pbio.0040277. Epub 2006 Aug 15. PMID: 16895442; PMCID: PMC1543691.
- Duarte, C., et al. 2020. "Rebuilding marine life." *Nature* 580 (7801), 39–51.
- Edgar, G., et al. 2014. "Global Conservation Outcomes Depend on Marine Protected Areas with Five Key Features." *Nature* 506 (7487): 216–20. <https://doi.org/10.1038/nature13022>
- Ehler, C. 2021. "Two decades of progress in Marine Spatial Planning." *Marine Policy*, 132: 104134.
- Enright, S., R. Meneses-Orellana, and I. Keith. 2021. "The Eastern Tropical Pacific Marine Corridor (CMAR): The Emergence of a Voluntary Regional Cooperation Mechanism for the Conservation and Sustainable Use of Marine Biodiversity Within a Fragmented Regional Ocean Governance Landscape." *Frontiers in Marine Science*, 569.

- FAO. 2024. "State of the World's Fisheries and Aquaculture 2024. Blue Transformation in Action." Rome, Italy. <https://doi.org/10.4060/cd0683en>
- FAO. 2022. "Fisheries OECM: Identifying, Evaluating, and Reporting Other Effective Area-based Conservation Measures (OECM) in Marine Fisheries Management." FAO Technical Series.
- Fleming, L., et al. 2019. "Fostering human health through ocean sustainability in the 21st century." *People and Nature*, 1(3), 276–283.
- Fraschetti, S. et al. 2012. Idiosyncratic effects of protection in a remote marine reserve. *Marine Ecology Progress Series*, 466, pp.21-34.
- Frazão-Santos, C. et al. 2016. "Ocean planning in a changing climate." *Nature Geoscience*. 9: 730±730. <https://doi.org/10.1038/ngeo2821>
- Frazão-Santos, C., et al. 2018. "Major challenges in developing marine spatial planning." *Marine Policy*. <https://doi.org/10.1016/j.marpol.2018.08.032>
- Frazão Santos, C., et al. 2020. "Integrating climate change in ocean planning." *Nature Sustainability*. <https://www.nature.com/articles/s41893-020-0513-x>
- Frazão-Santos, C., et al. 2022. "A sustainable ocean for all." *Nature: npj Ocean Sustainability* 1(2).
- Frazão-Santos, C., et al. 2023. "Advancing interdisciplinary knowledge for ocean sustainability." *npj Ocean Sustainability* (2023) 2:18; doi.org/10.1038/s44183-023-00026-6
- Frazão-Santos, C., et al. 2023. "Ocean planning and conservation in the age of climate change: A roundtable discussion." *ICES Journal of Marine Science*.
- Frazão-Santos, C., et al. 2024A. "Taking climate-smart governance to the high seas." *Science*.
- Frazão Santos, C., et al. 2024B. "Key components of sustainable climate-smart ocean planning." *npj Ocean Sustainability* 3, 10 <https://doi.org/10.1038/s44183-024-00045-x>
- Gignoux-Wolfsohn, S., et al. 2024. "New framework reveals gaps in US ocean biodiversity protection." *One Earth*. <https://doi.org/10.1016/j.oneear.2023.12.014>
- Gill, D., et al. 2024. "A Diverse Portfolio of Marine Protected Areas Can Better Advance Global Conservation and Equity." *Environmental Sciences* 121 (10).
- Grorud-Colvert, K., et al. 2021. "A framework to achieve global goals for the ocean: The MPA Guide." *Science* 373:6560. doi: 10.1126/science.abf0861.
- Halpern, B., et al. 2019. "Recent pace of change in human impact on the world's ocean." *Scientific Reports*, 9(1), 1–8.
- Herr, D., and E. Landis. 2016. "Coastal Blue Carbon Ecosystems. Opportunities for Nationally Determined Contribution." IUCN. Gland, Switzerland.
- Heymans, J., et al. 2020. "The ocean decade: A true ecosystem modeling challenge." *Frontiers in Marine Science*, 7, 766.
- Hernandez-Blanco, M., et al. 2023. "Common assets trusts for blue commons stewardship." *Marine Policy*.
- Hoegh-Guldberg, O. 2015. "Reviving the Ocean Economy: The case for action—2015." WWF International. Gland, Switzerland.
- Igin, C., et al. 2021. "Understanding Informality. CERP Discussion Paper" 16497. Centre for Economic Policy Research.
- ILO. 2018. "Women and men in the informal economy: A statistical picture." International Labour Organization.
- IIED. 2019. "Navigating ocean investments: How collaborative management can fill the marine conservation funding gap." <https://www.iied.org/navigating-ocean-investments>
- Issifu, I., et al. 2024. "Economics in Marine Spatial Planning: A Review of Issues in British Columbia and Similar Jurisdictions." *Sustainability* 16 (3): 1210. <https://doi.org/10.3390/su16031210>.
- Konar, M., and H. Ding. 2020. "A sustainable ocean economy for 2050. Approximating its benefits and costs." World Resources Institute. <https://www.oceanpanel.org/Economicanalysis>
- Lakshmi, A. 2021. "Coastal ecosystem services & human wellbeing." *Indian Journal of Medical Research*. 153(3):382-387. doi: 10.4103/ijmr.IJMR_695_21.
- Lloret, J., A. García de Vinuesa, and M. Demestre. 2023. "How human health and well-being depends on healthy marine habitats in the Mediterranean: A review." *Heliyon* 10 (2024) e24329 <https://doi.org/10.1016/j.heliyon.2024.e24329>
- Lombard, A., et al. 2019. "Practical Approaches and Advances in Spatial Tools to Achieve Multi-Objective Marine Spatial Planning." *Frontiers of Marine Science*. 6:166. doi: 10.3389/fmars.2019.00166.

- Mahon, R., and L. Fanning. 2019. "Regional ocean governance: Integrating and coordinating mechanisms for polycentric systems." *Marine Policy*, 107, 103589.
- Manea, E., T. Agardy, and L. Buongiorno. 2023. "Link marine restoration to ecosystem-based marine spatial planning to maximize ocean regeneration." *Aquatic Conservation: Marine and Freshwater Ecosystems*. <https://doi.org/10.1002/aqc.3999>
- Millennium Ecosystem Assessment. 2005. "Ecosystems and Human Well-Being." Island Press, Washington DC.
- Mizrahi, M., et al. 2019. "A Systematic Review of the Socioeconomic Factors that Influence How Marine Protected Areas Impact on Ecosystems and Livelihoods." *Society & Natural Resources* 32 (1): 4–20. <https://doi.org/10.1080/08941920.2018.1489568>
- Ostrom, E. 2008. "The challenge of common-pool resources: Environment." *Science and Policy for Sustainable Development*, 50(4), 8–21.
- Parravicini, V., et al. 2013. "Conserving Biodiversity in a Human-Dominated World: Degradation of Marine Sessile Communities within a Protected Area with Conflicting Human Uses." *PLoS ONE* 8(10): e75767. doi:10.1371/journal.pone.0075767.
- Pike, E., et al. 2024. "Ocean protection quality is lagging behind quantity: Applying a scientific framework to assess real marine protected area progress against the 30 by 30 target." *Conservation Letters* 17(3): e13020.
- Queirós, A., et al. 2021. "Bright Spots as Climate-Smart Marine Spatial Planning Tools for Conservation and Blue Growth." *Global Change Biology* 27 (21): 5514–31. <https://doi.org/10.1111/gcb.15827>
- Ram, J., D. Ramrattan, and R. Frederick. 2019. "Measuring the Blue Economy: The System of National Accounts and Use of Blue Economy Satellite Accounts." CDB Working Paper No. 2019/02.
- Rasheed, A. 2020. "Marine protected areas and human well-being – A systematic review and recommendations." *Ecosystem Services*, 41.
- Reid, A., et al. 2021. "'Two-Eyed Seeing': An Indigenous Framework to Transform Fisheries Research and Management." *Fish and Fisheries* 22 (2): 243–61. <https://doi.org/10.1111/faf.12516>
- Reimer, J., et al. 2023a. "Conservation ready marine spatial planning." *Marine Policy*. <https://doi.org/10.1016/j.marpol.2023.105655>
- Reimer, J., et al. 2023b. "The Marine Spatial Planning Index: A Tool to Guide and Assess Marine Spatial Planning." *Npj Ocean Sustainability* 2 (1): 15. <https://doi.org/10.1038/s44183-023-00022-w>
- Reimer, J., R. Devillers, and J. Claudet. 2020. "Benefits and Gaps in Area-Based Management Tools for the Ocean Sustainable Development Goal." *Nature Sustainability* 4 (4): 349–57. <https://doi.org/10.1038/s41893-020-00659-2>
- Robinson J., et al. 2021. "Nature's role in supporting health during the COVID-19 pandemic: A geospatial and socioecological study." *International Journal of Environmental Research and Public Health* 18(5):2227. doi: 10.3390/ijerph18052227.
- Schutter, M., et al. 2024. "Mapping flows of blue economy finance: Ambitious narratives, opaque actions, and social equity risks." *One Earth* 7, 638–649.
- Stuchtey, M., et al. 2020. "Ocean Solutions that Benefit People, Nature and the Economy." Washington, DC: World Resources Institute. <https://oceanpanel.org/publication/ocean-solutions-that-benefit-people-nature-and-the-economy/>
- Sumaila, U., and C. Tai. 2020. "End Overfishing and Increase the Resilience of the Ocean to Climate Change." *Frontiers in Marine Science* 7 (July):523. <https://doi.org/10.3389/fmars.2020.00523>
- Sumaila, U., et al. 2023. "Ocean Finance: Financing the Transition to a Sustainable Ocean Economy." In *The Blue Compendium*, edited by J. Lubchenco and P. Haugan, 309–31. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-031-16277-0_9
- Teh, L., and U. Sumaila. 2013. "Contribution of marine fisheries to worldwide employment." *Fish and Fisheries* 14:77-88.
- Valdez, J., et al. 2024. "Strategies for Advancing Inclusive Biodiversity Research through Equitable Practices and Collective Responsibility." *Conservation Biology*, August, e14325. <https://doi.org/10.1111/cobi.14325>
- Walsh, M. 2017. "Marine conservation finance: Strategies and finance mechanisms to improve the amount and efficacy of investment into marine conservation." Ph.D. Thesis, James Cook University. <http://researchonline.jcu.edu.au/51600/>

Ward, D., et al. 2022. "Safeguarding Marine Life: Conservation of Biodiversity and Ecosystems." *Reviews in Fish Biology and Fisheries* 32 (1): 65–100. <https://doi.org/10.1007/s11160-022-09700-3>

Winther, J.-G., et al. 2020. "Integrated Ocean Management for a Sustainable Ocean Economy." *Nature Ecology & Evolution* 4 (11): 1451–58. <https://doi.org/10.1038/s41559-020-1259-6>

World Bank Group. 2021. "The Economic Case for Nature: A Global Earth-Economy Model to Assess Development Policy Pathways." World Bank: Washington, DC. <https://openknowledge.worldbank.org/entities/publication/fcc11682-c752-51c4-a59f-0ab5cd40dc6f>

World Bank. 2022A. "Marine Spatial Planning for a Resilient and Inclusive Blue Economy. Key Considerations to formulate and implement MSP." ProBlue.

World Bank. 2022B. "Applying Economic Analysis to Marine Spatial Planning." World Bank Group Washington DC.

Worldwide Fund for Nature (WWF). 2020. "*Living Planet Report 2020—Bending the Curve of Biodiversity Loss*," edited by R. Almond, M. Grooten, and T. Petersen. WWF. Gland, Switzerland.



TOOLKITS

The following tools and guidance documents support improving management effectiveness in coastal communities (from The Nature Conservancy's contribution to MPAth (<https://mpath.help/>), the UN Environment Programme's online platform)



GUIDE

2019

Enabling Effective and Equitable Marine Protected Areas - Guidance on Combining Governance Approaches

PROVIDER | UN Environment Programme

This guide provides evidence-based advice on how to use governance of marine protected areas to promote conservation and share sustainable marine resources. It has been developed using marine protected area case studies from around the world. It provides a governance framework and highlights issues to address specific governance situations. It can be used as part of an adaptive management cycle.



GUIDE

2013

Designing Marine Reserves for Fisheries Management, Biodiversity Conservation, and Climate Change Adaptation

PROVIDER | USAID Coral Triangle Support Partnership

This guide provides an integrated set of biophysical principles to help practitioners design networks of tropical marine protected areas to achieve fisheries sustainability, biodiversity conservation, and ecosystem resilience in the face of climate change. The document also provides a succinct, graphic and user-friendly synthesis of the best available scientific information for practitioners who may not have access to, or the time to review, the increasing amount of research literature regarding this issue.



TOOL

2013

Designing Effective Locally Managed Areas in Tropical Marine Environments: A Facilitator's Guide to Help Sustain Community Benefits through Management for Fisheries, Ecosystems, and Climate Chang

PROVIDER | USAID Coral Triangle Support Partnership

This guide combines the latest scientific recommendations with local and traditional knowledge to maximize the ability of Locally Managed Areas (LMAs) to support resilience to climate change and other threats. It provides templates and detailed instructions for facilitation of community processes for LMAs including (1) outreach to understand key ecological and social factors that contribute to healthy and abundant resources, and the latest science-based recommendations for managing resources and (2) planning steps to develop LMA zones and rules that help build long-term healthy, abundant, and resilient coastal and marine resources. This facilitator's guide is designed for small planning teams consisting of people from communities, agencies, and facilitator organizations.



GUIDE

2017

Strong Voices, Active Choices: TNC's Practitioner Framework to Strengthen Outcomes for People and Nature

PROVIDER | The Nature Conservancy

This framework describes the Nature Conservancy's approach to partnering with Indigenous Peoples and local communities on shared conservation and sustainable development goals. The framework will be most useful in situations where human well-being outcomes and conservation outcomes are linked and interdependent, where the leadership of Indigenous Peoples and local communities is essential to achieving shared goals, where power imbalances may hinder achieving sustainable results for nature and people, and where projects may significantly impact local communities. Beyond a detailed description of the framework and overall theory of change for strengthened voice, choice, and action, the guide provides practical tips, tools, and resources to implement the framework.



ONLINE TRAINING

NO DATE

Measures Demystified

PROVIDER | The Nature Conservancy

A self-paced, online training curriculum, "Measures Demystified" is available on www.conservationtraining.org. The curriculum is free and open to the public. It provides students with the opportunity to explore, at their own pace, the process of considering the audience and conservation context for monitoring programs, as well as reviewing the fundamentals of articulating program logic and experimental design for cost-effective data collection, which is referred to as "measures." The concepts in this course can be applied directly to specific facets of the new conservation business planning approach.



TOOL

2013

Miradi

PROVIDER | Foundations of Success

Miradi – a Swahili word meaning "project" or "goal" – is a user-friendly program that allows nature conservation practitioners to design, manage, monitor, and learn from their projects to meet their conservation goals more effectively. With more than 10,000 users worldwide, the program guides them through a series of step-by-step interview wizards, based on the Open Standards for the Practice of Conservation. Miradi provides you and your team with the guidance and tools to implement the Conservation Measures Partnership's Open Standards for the Practice of Conservation (Conservation Standards). You can download the desktop version, and explore the online version. Miradi helps teams to:

- Define their project scope
- Design conceptual models and spatial maps
- Prioritize threats
- Develop objectives
- Identify and prioritize strategies
- Determine indicators to assess the effectiveness of strategies
- Develop work plans and budgets
- Export data for reports



ONLINE TRAINING

NO DATE

Planning for Conservation: Using the Conservation Standard

PROVIDER Conservation Measures Partnership

To achieve goals, the conservation community must determine the extent to which management actions are working – and we must be able to diagnose why some actions succeed while others do not. The Conservation Measures Partnership (CMP) has created the Open Standards for the Practice of Conservation to bring together common concepts, approaches, and terminology in conservation project and program design, management, and monitoring. This guide, Planning for Conservation: Using the Conservation Standards, provides detailed guidance on Steps 1 and 2 of the standards, which focus on assessing the situation and planning projects and programs.



GUIDE

2000

Socioeconomic manual for coral reef management

PROVIDER Australian Institute of Marine Science

Coral reef management has focused traditionally on the biophysical aspects of coral reefs, but today reefs are coming under increasing pressure from human activities. Understanding the socioeconomic context of reef stakeholders is essential for assessing, predicting, and managing reef use. This manual will assist coral reef managers around the world in making basic socioeconomic assessments in their communities.



TOOL

NO DATE

MARXAN

PROVIDER Open Source

Marxan is a suite of tools designed to help decision makers find good solutions to conservation planning problems. The goal is to ensure that anyone, anywhere can access data, collaborate, and implement spatial plans to support biodiversity conservation, economic growth, and climate adaptation and mitigation for the next decade. Marxan is a decision-support tool that helps structure, design, and evaluate spatial planning projects for land, freshwater, and ocean conservation. Marxan helps decision-making by balancing objectives such as protecting biodiversity and its benefits with socio-economic, cultural and political realities. The suite also includes extensive documentation and examples of frameworks for approaching conservation planning. Marxan is the analytic engine behind major planning projects such as the Great Barrier Reef's Rezoning Plan and Mongolia's National Protected Area portfolio. All told, it has been used in over 180 countries and leads the world in providing robust, flexible, and systematic decision support to governments, academics, and planners.



TOOL

2019

SAPA, SAGE or GAPA? Tools for assessing the social impacts, governance, and equity of conservation

PROVIDER International Institute for Environment and Development

IIED has led the development and testing of SAPA, SAGE, and GAPA, three software tools for stakeholders and rightsholders of protected or conserved areas (PCA actors). It allows them to assess the social impacts, governance, and equity of conservation and associated development activities.

SOCIAL IMPACTS: the effects on wellbeing of people living in or around a PCA.

GOVERNANCE QUALITY: the performance of a PCA in relation to principles of equitable governance. SAPA, SAGE, and GAPA use a framework of ten principles.

EQUITY: the performance of a PCA in terms of respect for actors and their rights, participation, transparency, accountability, dispute resolution, and how costs and benefits are distributed.

A decision tree helps practitioners decide which tool best suits their needs. Having chosen one, users get feasibility criteria in the SAPA and GAPA manuals to confirm that the site has created or is able to create the enabling conditions for good results.



GUIDE

2018

Social Assessment for Protected and Conserved Areas (SAPA) Methodology Manual for SAPA facilitators

PROVIDER International Institute for Environment and Development

This manual provides detailed guidance for using the Social Assessment for Protected and Conserved Areas (SAPA) methodology. SAPA is a relatively simple and low-cost methodology for assessing the positive and negative impacts of a protected or conserved area (PA/CA) and related conservation and development activities on the wellbeing of communities living within and around the PA/CA. It uses a process that enables stakeholders, working together, to increase and more equitably share positive social impacts and reduce negative ones. The methodology uses a combination of (1) community meetings to identify significant social impacts, (2) a short household survey to explore these impacts and related governance issues in more depth, and (3) stakeholder workshops to validate the results, explore other key issues, develop and plan relevant actions, and review progress. SAPA can be used with PA/CAs of any kind. This second edition replaces the first, which was published in March 2016.



GUIDE

2019

Governance Assessment for Protected and Conserved Areas (GAPA). Methodology manual for GAPA facilitators

PROVIDER International Institute for Environment and Development

This manual provides detailed guidance for people using or considering using the Governance Assessment for Protected and Conserved Areas (GAPA) methodology. GAPA is a methodology that brings together stakeholders and rightsholders to assess the quality of governance at a specific protected or conserved area. To date there has been little practical guidance on how to understand and assess governance and equity at protected and conserved areas -- this manual aims to fill that gap. GAPA seeks to improve governance over time through the generation and implementation of ideas for action. GAPA uses a combination of (1) key informant interviews and focus group discussions to identify governance strengths and challenges and ideas for action, (2) stakeholder workshops to discuss and validate the results and review the ideas for action, and (3) an optional site-level scorecard to provide a quantitative assessment of the governance issues and the diversity of views within and across communities.



TOOL

2017

MPA Connect Capacity Assessment Tool

PROVIDER | MPACconnect

The capacity-building initiatives by MPACconnect are founded on a management capacity tool that helps MPA managers meet conservation commitments.

MPACconnect is based on a practical, locally-relevant, and needs-driven capacity-building approach to support effective MPA management.

MPACconnect developed a specialized tool that facilitates the self-evaluation of management capacity needs and strengths relating to some 20 distinct elements of MPA management.

The MPACconnect capacity tool helps participating MPA managers to better understand and address local and regional MPA management capacity needs by guiding strategic peer-to-peer sharing of knowledge between MPA managers in the Caribbean.



GUIDE

2008

Establishing Marine Protected Area Networks—Making It Happen

PROVIDER | The World Conservation Union (IUCN)

This guide provides essential information to illuminate the role of marine protected area networks in achieving marine conservation. It utilizes current scientific knowledge, institutional experience, and global case studies to present the most relevant lessons in building resilient and functional networks. An important feature is the balance among social, economic, legal, and ecological considerations, which collectively contribute to management decisions. The tested techniques will help practitioners, managers, and field staff in designing and implementing marine protected area networks that are resilient to human and environmental threats.



GUIDE

2017

Large-Scale Marine Protected Areas (LSMPAs): Guidelines for Design and Management

PROVIDER | International Union for Conservation of Nature and Natural Resources

Although focused on aiding managers, these Guidelines are for anyone involved in supporting LSMPAs or the communities that hold an interest in them. The Guidelines are crafted to assist new LSMPAs from the earliest design phase and enhance the management of existing ones from planning and implementation through ongoing evaluation. Ultimately, the goal is to increase the effectiveness of LSMPAs so that they contribute to global conservation targets in ways that truly benefit humanity.



REPORT

2019

A Practical Guide to Effective Design and Management of MPAs for Sharks and Rays

PROVIDER | Worldwide Fund for Nature

This Guide provides practical, science-based advice on how to maximize the effectiveness of both new and existing shark and ray MPAs, to ensure that these animals are protected now and far into the future. While it will be of interest to anyone wanting to know more about the subject, it's particularly aimed at:

- Authorities responsible for marine habitat and species protection
- National fisheries managers
- Regional fisheries management organizations (RFMOs)
- NGOs and other conservation practitioners
- Shark and ray tourism operators.



GUIDE

2013

Guide for Quick Evaluation of Management in Mediterranean MPAs

PROVIDER | WWF-Italy, IUCN Center for Mediterranean Cooperation

This guideline describes a structured process used to identify the indicators most useful for evaluating management in Mediterranean Marine Protected Areas (MPAs). The indicators address all elements of the management effectiveness framework of the IUCN World Commission on Protected Areas (WCPA), covering all dimensions of MPA management, from management approaches to final outcomes of biodiversity conservation, stakeholder participation, governance, and socio-economic impacts. This system is the first-ever Mediterranean-level approach. It may prove to be a useful tool for informing international and national policies and programs on protected areas.



TOOL

2020

The Management Effectiveness Tracking Tool (METT) 4

PROVIDER | Open Source

First published in 2002, the METT was one of the first tools developed to reflect the IUCN WCPA Framework for Protected Area Management Effectiveness (PAME). Several versions of the METT and many adaptations have been produced, reflecting lessons learned through implementation—by 2016 the METT had been applied in 127 countries worldwide. In 2020 a new version (the fourth, METT-4) was developed, and for the first time is presented as an Excel tool which aids implementation and compilation of results. The METT consists of two main sections:

Datasheets that collect key information on the protected area, its characteristics, threats, and management objectives, and details of who carried out the assessment.

An assessment form that provides a composite measurement across 38 parameters integrating all six components of the WCPA Framework. The form is designed around a questionnaire with four alternative responses, each with an associated score ranging from 0 (poor) to 3 (excellent). Each question has data fields to include notes about the answers (with justification if possible), steps to be taken to improve management if necessary and details of information sources. Additional worksheets in METT-4 allow for more detailed assessments of community relations, planning processes, condition of natural and cultural values, key species, and habitats.



TOOL

2021

Integrated Management Effectiveness Tool (IMET) 2.5

PROVIDER | BIOPAMA

IMET is a Protected Area Management Effectiveness (PAME) tool that allows an in-depth assessment of marine and terrestrial protected areas, regardless of their management categories and governance type. It is also a decision support tool that helps protected area managers make analysis-based decisions for improved conservation outcomes. The IMET can be used to:

identify management strengths, constraints, and weaknesses .

consider key values of the protected area to ensure that the management is results-oriented, and supports the identification of conservation priorities.

support capacity building on protected area planning, monitoring, and evaluation to serve outcome-oriented management.

support the application of the protected area to the Green List.



GUIDE

NO DATE

Training Manual for Marine Protected Areas Management

PROVIDER | Caribbean Marine Protected Area Management (CaMPAM) Network and Forum

One of the most important reasons for management challenges in Marine Protected Areas (MPAs) in the Caribbean has been the lack of qualified personnel. To address this issue, CaMPAM launched and supported a “Training of Trainers” (ToT) Program for MPA managers. Managers are instructed in all aspects of MPA management and on adult education techniques to conduct local and tailored training activities in their MPAs.



FACTSHEETS

NO DATE

Factsheets on MPAs Best Management Practices: Zoning, Sustainable Finance, Stakeholder Engagement, Networking, Monitoring and Assessment, and Governance

PROVIDER | Caribbean Marine Protected Area Management (CaMPAM) Network and Forum

Under the Caribbean Challenge, the government of Italy through its Ministry of Foreign Affairs funded a UNEP-CEP project aiming to strengthen capacities for MPA management in a selection of Caribbean countries. One of the outcomes was the identification and synthesis of best practices related to the establishment and management of protected areas. They are presented here as thematic factsheets. Conceived as a practical tool for managers, the factsheets summarize the main issues and the best methods to address them, as well as providing numerous case studies and references.



GUIDE

NO DATE

The Indigenous Guardians Toolkit

PROVIDER	Nature United, working in collaboration with Indigenous communities across Canada.
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The Indigenous Guardians Toolkit helps communities across Canada learn, share, and connect about Indigenous Guardian programs, be inspired by other communities, find practical information, and share experiences. The Toolkit is designed for people who are looking for easy-to-access information about building and implementing Guardian programs. Every Indigenous Guardian program is unique, so the information throughout the Toolkit is intended to be used, modified, copied, printed, downloaded, shared, and added to. The Toolkit is designed for anyone who is developing, managing, or implementing an Indigenous Guardian program or supporting guardian activities. Whether you are a community leader looking to get started, a program manager looking for new ways to fund core activities, or an Indigenous Guardian looking for information about what other communities are doing, this toolkit will help you. You will find tips, worksheets, templates, infosheets, stories, community resources, and links to help build and strengthen Indigenous Guardian programs.



TOOL

2021

The Self-Assessment Tools (SAT)

PROVIDER	EU-funded Ocean Governance Project
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The Marine Mammal Twinning has created a toolkit for the inclusion of marine mammals into MPAs. The aim of the Marine Mammal Twinning tool is to help build the technical capacities of MPA managers by sharing knowledge, expertise, and good practices. The toolkit contains three key components: factsheets, Self-Assessment Tools (SATs), and good practices. The Self-Assessment Tools have been created for MPA managers, stakeholders, and any other relevant parties to assess the extent to which marine mammals are included in their management plans. Both versions of the SAT consist of questions related to 23 factsheet topics. The answers to these questions have all been assigned a numerical value, the total of which shows how extensively marine mammals have been accounted for in the management plan, and ways in which this can be improved. The factsheets are intended as resources for general knowledge, examples of best practices, and available trainings.



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