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INTEGRATED SEASCAPE MANAGEMENT

Knowledge Factsheet Series | #4

April 2022

Biodiversity and Ecosystem Services in Marine Spatial Planning

Supporting biodiversity and healthy ecosystem services in oceans and coasts

HOW CAN MARINE SPATIAL PLANNING HELP COUNTRIES MANAGE THEIR OCEANS AND COASTLINES?

Marine biodiversity is critical to the Blue Economy. It underpins ecosystem services that are vital for global functions such as climate regulation, fisheries management, and beach management for coastal protection and recreation. But unlike most land-based resources, oceans are more subject to open access than terrestrial resources. This can result in overexploitation by multiple users who may not even be aware of each other. This greatly complicates efforts to understand and manage cumulative impacts on biodiversity and ecosystem services (BES). Marine spatial planning (MSP) offers coastal countries a tool to address this challenge. It provides spatial mapping of BES and the threats they face, bringing together diverse users in a participatory, holistic approach that promotes the mainstreaming of BES into goals for other economic sectors. It allows for trade-offs between different oceanic sectors to help build a more sustainable approach for the use of common resources.

The Blue Economy is defined by the World Bank as the sustainable and integrated development of economic sectors in healthy oceans.[1]

IMPORTANCE OF MARINE BIODIVERSITY AND ECOSYSTEM SERVICES

Protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development, as outlined in the WBG's Environmental and Social Standards (ESS) 6.[2] Oceans' account for 90 percent of the habitable space on the planet, and generate enormous economic wealth because of the resources and ecosystem services they provide.[3]

Roles Oceans and Coasts Play in Human's Lives

REGULATING SERVICES

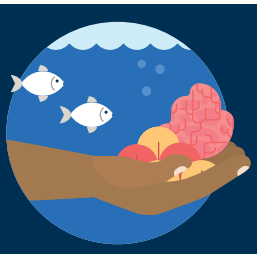
- Uptake and redistribution of natural and anthropogenic CO2 and heat
- Coastal erosion control, sediment trapping
- Shoreline protection
- Water purification
- Air-quality regulation
- Weather regulation

PROVISIONING SERVICES

- Food (fishing and aquaculture)
- Water storage and provision (water extraction in marine and coastal environments)
- Biotic materials and biofuels (medicinal, ornamental, commercial resources, biomass for bioenergy)
- Tourism
- Energy sources (oil, gas, timber)
- Renewable energy (wind, wave, tidal, thermal)
- Genetic resources
- Trade and transport
- Habitable environments

SOCIAL AND CULTURAL SERVICES

- Health and well-being
- Culture and traditional knowledge especially for Indigenous persons
- Recreation
- Heritage
- Mental health
- Education



SUPPORTING SERVICES

- Biological diversity maintenance
- Nutrient cycling and primary production
- Biological regulation
- Life cycle maintenance

Source: IPCC 2019

CURRENT STATE OF MARINE BIODIVERSITY AND ECOSYSTEM SERVICES

Pressure on coastal and marine resources is on the rise globally, as demand for their BES continues to intensify.[4] The lack of tools (such as marine spatial planning) that bring together all users of a particular marine space has resulted in overexploitation of resources and poor understanding of cumulative impacts.

Already more than half of the world's oceans are considered to be heavily disturbed by human activities.[5] Over-harvesting of organisms, expanding use of land and sea, climate change, and the spread of invasive species are important drivers of marine BES loss. [6]

Ecosystems are suffering declines in size and condition on historic levels: [7]

Seagrass meadows

decreased by more than

30%

between 1970 to 2000.

Wetland areas

have declined by more than

85%

since the 1970s.[8]

Live coral cover

is down by approximately

50%

since the 1870s. [9]

Thirty-four percent of fish stocks are overexploited, with illegal, unreported, or unregulated (IUU) fishing contributing up to a third of the world's reported catch.[10] Nearly half of global fish catch comes from small-scale, vulnerable fisheries.[11]

Marine transportation (including tourism-related transportation) has risen rapidly—as much as threefold—in the past 20 years. [12]

Solid waste has appeared in all the world's oceans, including remote or deep areas. Evidence is mounting that plastic micro-and nanoparticles have enteredmfood sources. Fish are being contaminated by persistent organics, while living organisms are suffering from high nutrient concentrations.[13]

The loss of marine BES threatens catastrophic impacts for society:

Disruption of **fish supply**

that provide about

3.3 billion people

with an average 20 percent of their intake of animal protein, a rate that is higher in some developing countries and small island developing states (SIDS).[14]

Destruction of **coastal habitats and coral reefs**

that reduces protection services and benefits, increasing flood risk for life and property of

100–300 million people

living in 100-year flood zones along coasts.[17]

Damage to **coastal and marine fisheries**

that support nearly

60 million people

including millions living in SIDS. [15,16]

mangroves loss

that translates into CO_2 emissions estimated at between

7 and 28 million

tons annually. [18]

In sum, current trends of marine BES loss are doing great harm to communities, value chains, economies, and developmental gains, especially for people living in poverty.[19] These losses may hold back progress[20] towards 80 percent of the Sustainable Development Goals.[21] Failure to achieve previous goals such as the Aichi Biodiversity targets makes it more important than ever to mainstream ecosystem services into decision-making. This will require precise data on the state and trends of the oceans, utilizing tools such as MSP to map BES that coastal and marine economies depend upon and to build their value and sustainability into development plans.[22]

MSP offers a transboundary, multi-sectoral solution to address BES loss by:

- spatially documenting regional and social differences in BES loss, highlighting priority areas, including Natural and Critical Habitats,
- using an iterative, responsive process to address how climate change affects BES loss and communities,[23]
- bringing stakeholders together in a participatory process to better understand cumulative impacts,
- applying a holistic and integrated approach to all human-environment interactions, including those that link land and sea,[24]
- helping businesses move from seeking narrow objectives to multi-faceted, integrated, holistic ones,[25] as well as shifts to nature-smart activities and active restoration of BES, and[26]
- helping neighboring governments cooperate on these issues and share relevant data.[27]

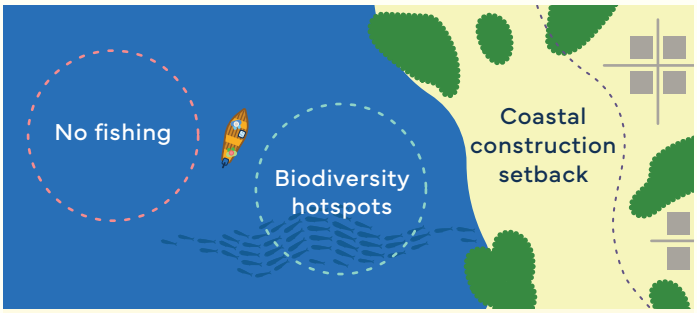
USING MARINE SPATIAL PLANNING TO SUPPORT BIODIVERSITY AND ECOSYSTEM SERVICES

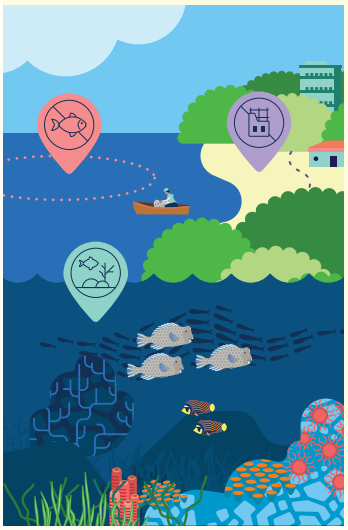
MSP can improve BES management in all important oceanic sectors. Solutions presented here are not "one-size-fits-all," but provide a guide for approaching complex issues.

Marine spatial planning can support **sustainable fisheries** *by*

- providing a framework for countries to develop sustainable fishing policies and regulations and reach seafood trade agreements that promote sustainability,
- identifying areas where pressure on fishing is not sustainable,
- making fishing stakeholders more accountable by monitoring fishery indicators in MSP,
- combating illegal, unreported, and unregulated (IUU) fishing through transboundary fishing regulations and by making other economic users of the space more aware of IUU activities,
- identifying areas of high biodiversity value that overlap with fisheries production, to promote enhancement, conservation, zoning, and reduction of pressures from pollution, destructive extractive activities, and unnecessary development in land and oceans,[28]
- monitoring and mapping fishery-dependent ecosystems with a focus on their resilience to climate change,
- strategically siting mariculture enterprises, and
- mapping the spatial distribution of species (including the dynamic distribution of mobile species), especially those of high biodiversity value, the interconnectivity of supporting ecosystems, and sources of potential spread of invasive alien species.

Marine spatial planning can support **sustainable land and coastal use planning** *by*



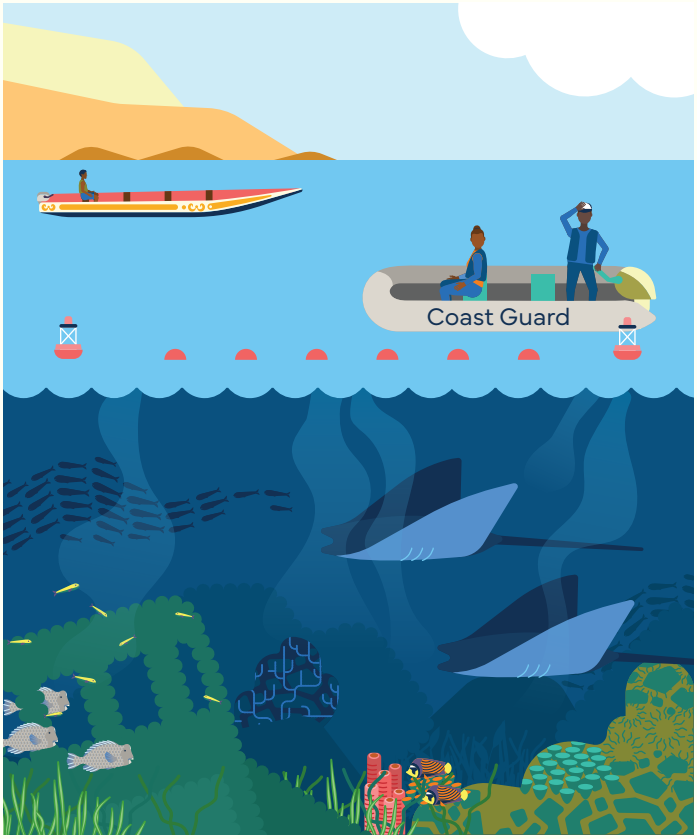


- making the case for nature-based solutions (NBS) such as mangrove restoration to prevent coastal erosion, by ensuring they are discussed and by connecting NBS experts with economic sector stakeholders,
- identifying ideal types of NBS for different challenges (flood reduction, food security) based on ecosystem services maps or other ecological and spatial considerations,
- spatially connecting land, coastal, and marine uses ("ridge-to-reef") to support a holistic, cross-sectoral approach,
- helping reduce cumulative impacts on marine sectors by identifying threats and conducting impact assessments, and
- mapping globally connected areas of high biodiversity value for enhancement, conservation, zoning, and reduction of pressures from pollution, destructive extractive activities, and unnecessary development in land and oceans.

Marine spatial planning can support **marine and coastal ecosystem restoration** *by*

- mapping ecosystem services, including their co-benefits, to help make the case to decision-makers and funders,
- siting restoration activities based on spatial variability in environmental conditions, threats to their health, connectivity with other ecosystems, and human-ecosystem interactions,[29]
- considering not only biodiversity goals in siting restoration activities, but the spatial impact the ecosystem services will have once they are restored,[30] and
- preventing unnecessary land- and sea-use expansion, especially into critical habitats.

Marine spatial planning can support **marine protected areas (MPAs)** *by*

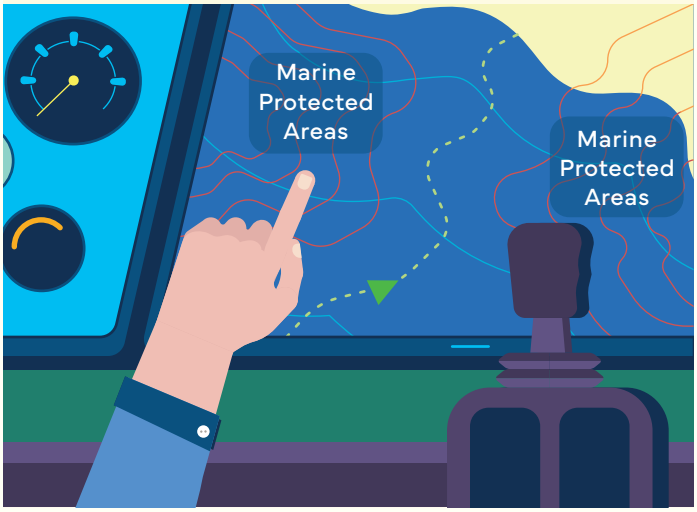


- strategically locating new MPAs based on high biodiversity value, ecological significance, size, and proximity to human threats or other protected areas, especially in underrepresented regions,
- strengthening ecological and management linkages between existing MPAs through their siting and engagement of stakeholders,
- providing a framework to improve management, protection, and enforcement,
- providing a participatory and inclusive environment for all stakeholders, especially Indigenous people and local communities that are connected to the MPA, and
- identifying areas of Natural and Critical Habitat per the WB's ESS6 definitions near MPAs and enhancing ecosystems within or near MPAs.

Marine spatial planning can support **sustainable tourism** *by*

- making the case for investing in nature-based tourism by identifying ecosystem service benefits and maximizing biodiversity,
- using a holistic, participatory approach to preserve culture, food security, and local livelihoods that often underpin tourism,[31] and
- identifying opportunities – spatially and through dialogue - for tourism stakeholders to partner with other initiatives that address BES loss, such as programs related to population growth, cultural shifts, and solid waste management.[32]

Marine spatial planning can support **sustainable offshore renewable energy, shipping and transport** *by*



- helping to ensure the application of mitigation hierarchy and risk-based management to avoid areas of high biodiversity value and areas that provide ecosystem services,
- providing a framework to help countries develop nature-smart operations and infrastructure policies, including sustainable shipping labels and certifications, technologies to reduce fuel consumption, adoption of a circular economy approach, and prevention of unnecessary port expansion (including harmful dredging) and illegal discharge of ballast water,
- supporting the development of offshore wind energy markets by providing a degree of certainty on access to marine spaces and resources and reducing associated adverse impacts on BES,[33]
- supporting consistent and accurate monitoring of the potential impacts on marine BES of offshore renewable energy development, from construction to operation,
- accounting for legally protected and internationally recognized areas of high biodiversity value, migration routes, interactions with other sectors, and predicted changes in oceanic patterns due to climate change when planning sites for offshore renewable energy, and
- identifying potential co-activities to support BES, for example, oyster farming at the base of renewable energy infrastructure built offshore.

Marine spatial planning can support a **circular economy** *by*

- integrating supporting policies, regulations, and guidelines for the adoption of regenerative production and consumption models, elimination, and reduction in consumption of virgin plastic materials, and internationally coordinated strategies for waste management, and
- spatially mapping floating marine litter to help identify pollution sources and prevent impact. [34]

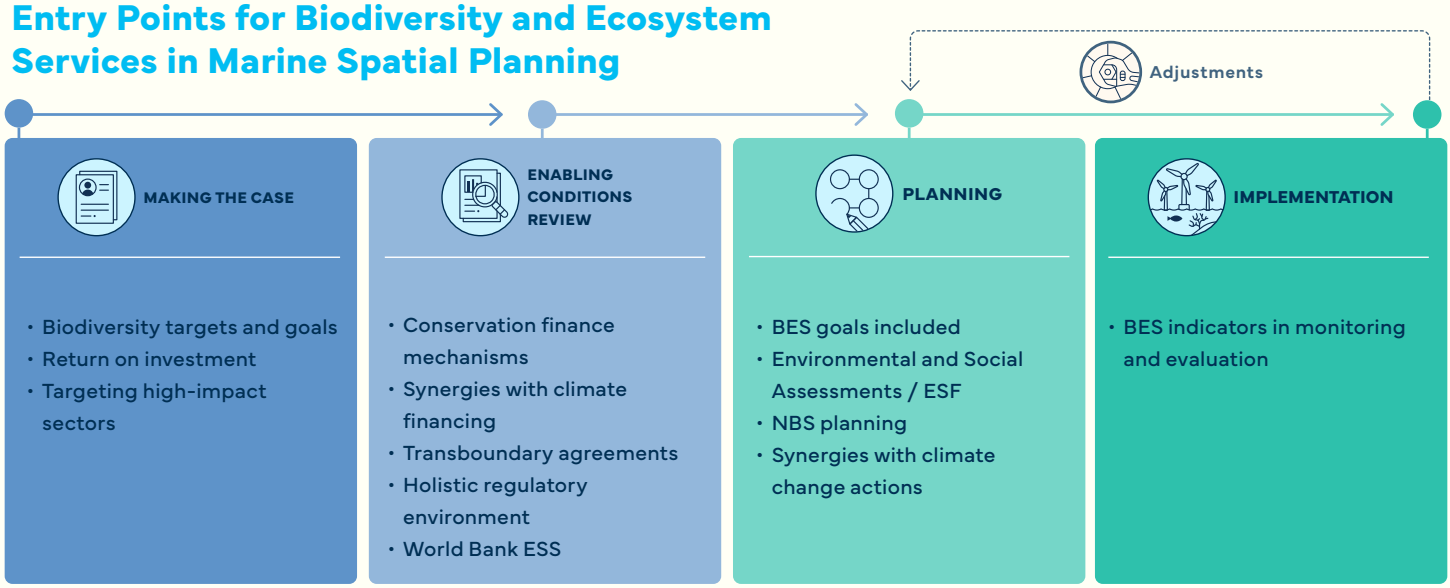
SUPPORTING ENABLERS FOR BIODIVERSITY AND ECOSYSTEM SERVICES IN MARINE SPATIAL PLANING

Conservation finance mechanisms can help close the financial gap if BES loses supporting non-market and market-based economic instruments. The new mechanisms would encourage long-term investment in nature financing and provide a transparent process for calculating return on investment.[35] They could include incentivized debt conversions for conservation, mitigation banking, payment for ecosystem services, biodiversity credit or offset schemes, blue-carbon credits, and incentives for sustainability, cap-and-trade programs, blue bonds, and trust funds.[36]

Data and tools, based on best available science and translated into language that decision-makers can understand, help broaden the understanding of human-ecosystem interactions and dynamics.[37] This is especially important for mapping and assessing ecosystem services and existing or emerging coastal and marine uses, with special emphasis on transboundary data, which can harmonize spatial plans between member states.[38]

The World Bank's Environmental and Social Framework (ESF) serves as a tool to integrate sustainability into marine spatial planning through application of the 10 Environmental and Social Standards (ESS). The standards focus on avoidance, minimization, mitigation, and where significant residual impacts remain, compensation for offsetting them. The standards also provide opportunities to enhance positive impacts. ESS6 seeks to protect biodiversity, apply mitigation hierarchies and precautionary approaches, promote sustainable management and support livelihoods through integrated conservation needs.[39] The ESF systematically allows for consideration of BES-related risks in investment decisions, right from upstream planning to on-the-ground implementation.

Entry Points for Biodiversity and Ecosystem Services in Marine Spatial Planning



KEY RECOMMENDATIONS FOR STRONGER BIODIVERSITY AND ECOSYSTEM SERVICES IN MARINE SPATIAL PLANING

Making the Case

Identify progress toward biodiversity targets and goals to help countries assess their advancement on the biodiversity and climate change agenda, and guide future decisions to support the Blue Economy.

Utilize economic valuation and conservation finance mechanisms for BES to demonstrate value and identify return on investment, thereby improving BES-driven MSP.[40]

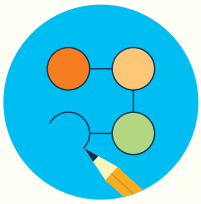
Promote the use of NBS that have multiple co-benefits as a mechanism for securing ecosystem functions that economic activities depend upon.

Enabling Conditions

Highlight multilateral environment agreements that provide transboundary support, as the marine environment transcends geopolitical, socio-economic, and financial boundaries.

Develop a holistic institutional and regulatory environment, especially to assess cumulative effects of economic development, management, and environmental change on the marine ecosystem.[41]

Tap into global BES financial arrangements and funding opportunities that exist through various development programs, global funds, and partnerships (with NGOs, and public-private enterprises), as well as climate-change adaptation financing.



Planning

Incorporate biodiversity goals into overall MSP goals, to assure harmonized and sustainable development in all activities.

Utilize existing data tools and models, including biodiversity impact assessments and safeguards, to better guide decision-making and plans.

Emphasize nature-based solutions, especially area-based management tools such as marine protected areas as a solution to achieve overall biodiversity and conservation goals.[42]

Implementation

Incorporate BES indicators for monitoring and evaluation of MSP, which can help assess implementation status and guide future adjustments of the plan.

Marine BES is integral and at the core of Blue Economy, yet their current and predicted state is in an overall decline. Each target area has different contexts, with respect to ecosystems present, social and infrastructural arrangements, and priority economic sectors. However, harmonized and long-term sustainable development of the Blue Economy is possible, and can be supported by MSP alongside other tools.

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More information:

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problue@worldbank.org

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