

Implementing blue Nature-based Solutions to tackle climate change and biodiversity loss and improve human health and wellbeing



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This policy brief provides guidance on the common features those designing and implementing marine and coastal Nature-based Solutions (blue NBS) should consider to help advance their development.

Blue NBS provide a framework for an integrated and inclusive social-ecological approach to environmental management, helping balance multiple social and management objectives in an area. Taking a scientific and stakeholder-informed approach, guidance is provided for three key aspects of blue NBS design and implementation: objectives, function, and mechanisms. These aim to help foster cohesive blue NBS initiatives.

Introduction

The importance of improving marine and coastal ecosystem health for people and nature is well-recognised¹⁻³, including in international commitments such as the United Nations Sustainable Development Goals, Convention on Biological Diversity, Framework Convention on Climate Change, and in their current Decades of Ocean Science and Ecosystem Restoration.

Blue NBS have emerged as an important part of the response for addressing societal challenges⁴. Blue NBS aim to advance environmental management beyond established ecosystem-based approaches by integrating protection, restorative activities, and other management interventions through a cohesive social-ecological approach.

Finding ways to develop and upscale inclusive and integrative blue NBS is crucial for improved marine and coastal social-ecological management. Because effective blue NBS design and implementation depend on social-ecological context, a one-size-fits-all approach is not possible or desirable. Nonetheless, key aspects of blue NBS design and implementation have been identified by combining scientific research conducted during the MaCoBioS project with insights gathered from stakeholder engagement workshops spanning September 2022 to March 2023.

Elaborated below, these aspects are categorised into three areas: objectives, function, and mechanisms. To advance blue NBS, these features should be collectively considered throughout the project cycle (conceptualisation, design, implementation, monitoring, evaluation, and adaptation) alongside locally specific contexts and existing management.



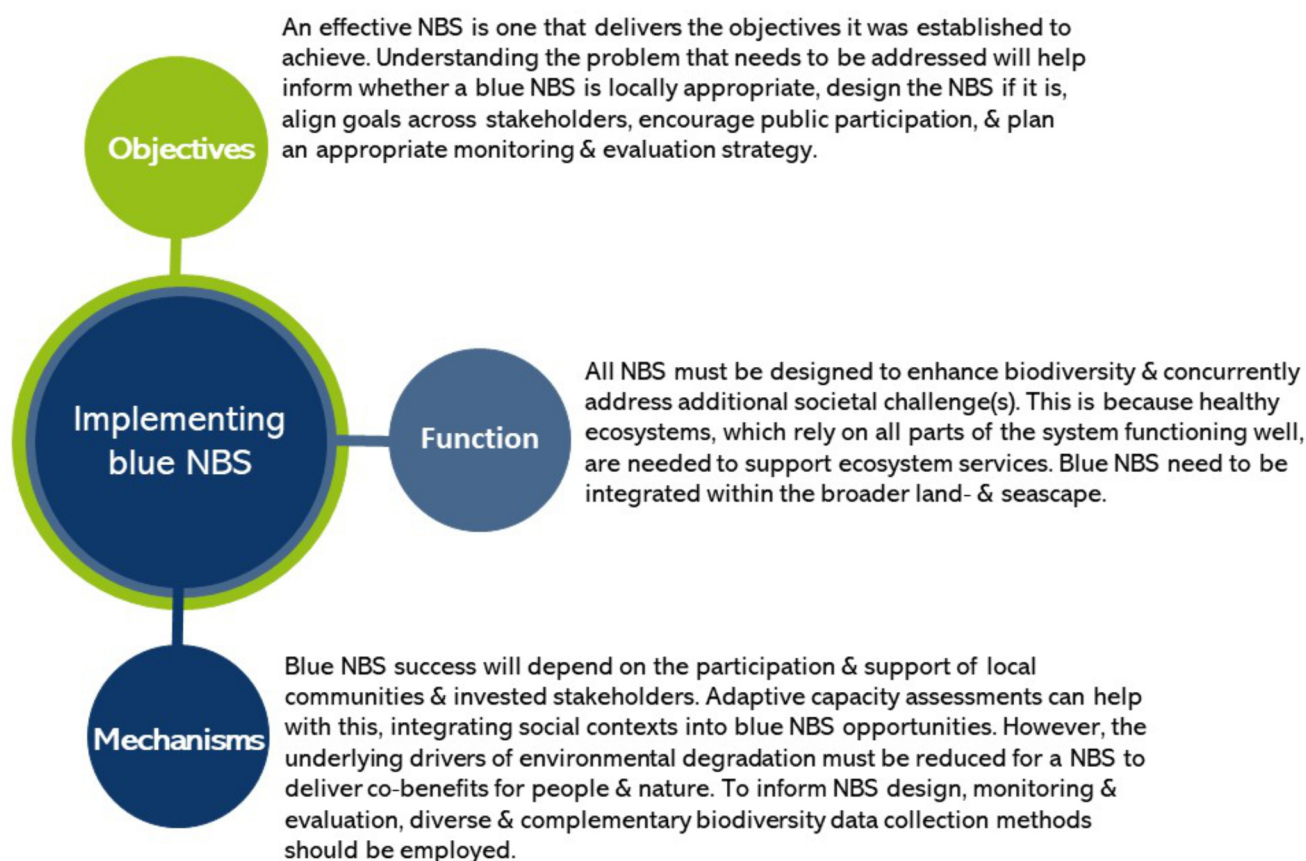
- ① Look after nature
- ② Protect coastal areas & communities
- ③ Promote food security
- ④ Contribute to climate change mitigation & adaptation
- ⑤ Support jobs, lifestyle, wellbeing, & culture
- ⑥ Support national efforts towards global goals for nature & people



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Key aspects of blue NBS design and implementation

Work conducted through MaCoBioS identified three key aspects – Objectives, Function, and Mechanisms – that should be considered prior to, during, and after blue NBS implementation:



Objectives

Take a place-based approach. Not all interventions fit every context, considering ecosystem conditions, nearby human activities and their impacts, short- and mid-term environmental projections, and societal factors like acceptability, feasibility, and capacity. Tailoring blue NBS locally may require integrating various types of interventions and combining state- and stakeholder-led approaches to management. Before implementing blue NBS, review the local context to inform decision-making and facilitate compromises, incentivise long-term stakeholder participation, and understand stakeholder and environmental needs.

Adopt an inclusive approach. For blue NBS to deliver intended social and ecological outcomes, stakeholder participation and support are vital.

This hinges on involving diverse and representative stakeholders in the project cycle in ways and at times fitting to engagement goals and stakeholder interests and capacity. Planning engagement activities with different stakeholder groups helps make participation manageable, adds value to decision-making, and builds trust and social capital.

Select appropriate objectives. Blue NBS may have diverse ecological, social, and economic objectives, but each must be desirable, viable, and feasible. As intervention success should be assessed based on the objectives it was designed to achieve, setting inappropriate objectives may doom a blue NBS to 'fail'. Setting clear objectives derived from a stakeholder-led vision is vital for informing the project cycle of a blue NBS.

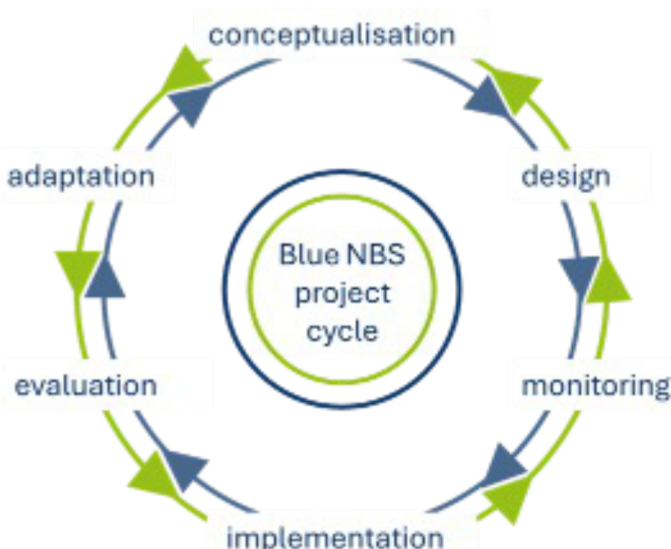
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Function

Ensure positive outcomes for nature. Ecosystems in good ecological condition are more resilient to environmental change. Continuous and long-term monitoring is necessary to evaluate whether outcomes from blue NBS are being achieved and inform adaptive management. Ecological indicators selected for monitoring ecosystem condition should integrate different aspects of ecosystems (e.g., physical environment, species diversity, trophic level, and human pressures). The choice of indicators depends on blue NBS objectives and social-ecological context.

Plan at the land- and seascape scale. Marine and coastal ecosystems are highly connected, meaning their health and functioning depends on surrounding habitats and human impacts. Blue NBS must consider social-ecological interactions beyond intervention boundaries to avoid external influences compromising intervention effectiveness and to mitigate unforeseen consequences from management change. Incorporating systems thinking into blue NBS projects facilitates the development of synergistic and inclusive management strategies, helps anticipate potential co-benefits and trade-offs, and encourages ongoing learning.



Mechanisms

Prioritise local input. Blue NBS integrate diverse perspectives to support local communities in adapting to change and enhancing biodiversity. Understanding the adaptive capacity of coastal communities helps identify vulnerabilities and conditions that could be enhanced to facilitate early adaptation. Evaluating adaptive capacity within the blue NBS project cycle fosters stakeholder engagement, local knowledge generation, and community empowerment. When selecting indicators, local contexts and spatial-temporal scales must be considered, as nearby communities and actions can affect adaptive capacity.

Mitigate local stressors driving environmental degradation. Mitigating local stressors via blue NBS will help to maintain, or improve, ecological condition and resilience by protecting biodiversity, supporting ecosystem connectivity and therefore enhancing resistance to perturbations, and facilitating recovery after disturbances. Effective blue NBS require understanding local stressors, baseline conditions, and existing management actions. Implementing strategies to minimise impacts from local stressors is among the most effective actions we can pursue to maximise potential beneficial outcomes amidst an uncertain future due to climate change.

Monitoring and evaluating ecological outcomes. Monitoring ecological outcomes from blue NBS requires sufficient and appropriate biodiversity data to be collected and interpreted. Non-invasive monitoring methods that facilitate data collection at local to seascape scales should be prioritised to avoid ecological damage. A suite of complementary methods should be used to provide a more comprehensive understanding of the state of ecosystems and the pressures affecting them, and enhance the accuracy and reliability of ecological assessments.



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Blue NBS policy recommendations

- Demand blue NBS to integrate positive outcomes for nature and systems thinking as core components of their design.
- Encourage blue NBS that embed stakeholders in the project cycle and combine state- and stakeholder-led approaches to blue NBS implementation, developing partnerships and responding to local needs.
- Develop or strengthen implementation funding programmes to encourage practitioner-researcher-community collaborations throughout a blue NBS project cycle.
- Ensure blue NBS are implemented with clear, unambiguous, desirable, viable, feasible and complementary objectives that can be measured with suitable indicators.
- Require blue NBS to have a long-term continuous monitoring and evaluation strategy that employs diverse data collection methods.
- Integrate blue NBS into land- and seascape planning, recognising the impacts of land use on marine and coastal ecosystems and opportunities for synergies in management.
- Support blue NBS through sustainable financing mechanisms.

For more information about the topics discussed in this policy brief, please refer to the accompanying policy guidelines⁵.

References ¹ Diaz *et al.* (2019) <https://doi.org/10.1126/science.aax3100> | ² IPBES. (2022) <https://doi.org/10.5281/zenodo.3831673> | ³ IPCC. (2022). *Climate Change 2022: Impacts, Adaptation, and Vulnerability*. <https://www.ipcc.ch/report/ar6/wg2/> | ⁴ O'Leary *et al.* (2023) <https://doi.org/10.1016/j.nbsj.2022.100044> | ⁵ O'Leary *et al.* (2024). Implementing blue Nature-based Solutions to tackle climate change and biodiversity loss and improve human health and wellbeing. In O'Leary, BC., Krause, T, Espinoza Córdova, F, Fonseca, C, Frehen, L, Roberts, CM (Eds), *Deliverable 4.3 – Nature-based Solutions Policy Guidelines* (pp. 31-37). MaCoBioS.

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