Welsh Government

Marine Net Benefit (MNB) Scoping Study

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Acronyms

Acronym	Definition
BNG	Biodiversity Net Gain
DAERA	Department of Agriculture, Environment, and Rural Affairs
DECCA	Diversity, Extent, Condition, Connectivity, Adaptability
Defra	Department for Environment, Food & Rural Affairs
DFO	Department of Fisheries and Oceans Canada
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
GBF	Global Biodiversity Framework
GES	Good Environmental Status
HRA	Habitats Regulations Assessment
LNRS	Local Nature Recovery Strategy
LPA	Local Planning Authority
MCZ	Marine Conservation Zone
MEEB	Measures of Equivalent Environmental Benefit
MLWM	Mean Low Water Mark
MMO	Marine Management Organisation
MNB	Marine Net Benefit
MNG	Marine Net Gain
MPA	Marine Protected Area
MPSRG	Marine Planning Stakeholder Reference Group
MRF	Marine Recovery Fund
NBB	Net Benefit for Biodiversity
NEMA	National Environment Management Authority
NGO	Non-governmental Organisation
NID	Nature Inclusive Design
NPF	National Planning Framework
NRW	Natural Resources Wales
NSIP	Nationally Significant Infrastructure Project
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OWEIP	Offshore Wind Environmental Improvement Package
PEO	Positive Environmental Outcomes
PPW	Planning Policy Wales
SDG	Sustainable Development Goal
SMEEF	Scottish Marine Environmental Enhancement Fund
SMNR	Sustainable Management of Natural Resources
SNCB	Statutory Nature Conservation Body
SoNaRR	State of Natural Resources Reports
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
WNMP	Welsh National Marine Plan

Executive Summary

This Marine Net Benefit (MNB) Scoping Study examines whether, and how, a net benefit approach could be applied to the marine environment in Wales. It responds to increasing interest in moving beyond mitigation alone to explore mechanisms that could support long-term marine recovery and resilience alongside sustainable development. The study draws on a review of international, UK and devolved government policy and practice, together with input from key stakeholders in Welsh planning and policy across regulators, industry and user groups, and Non-Government Organisations (NGOs). This scoping study does not assume that MNB will be pursued as policy, but provides an evidence base to support Welsh Government consideration of whether such an approach could contribute to marine recovery objectives, and what form it might take if explored further.

Wales is supported by a well-established and enabling policy and legislative framework within which MNB could be considered. Key legislation, including the Environment (Wales) Act 2016 and the Well-being of Future Generations (Wales) Act 2015, together with the principles of Sustainable Management of Natural Resources (SMNR), already promote long-term resilience, prevention, integration, and adaptive management. The Welsh National Marine Plan (WNMP) also provides a coherent spatial and policy framework for marine decision-making, incorporating risk-based approaches to licensing and sectoral development, and could offer a practical mechanism through which any future MNB considerations might be integrated.

This scoping study finds that, although there are terrestrial examples for delivering a 'net benefit' approach, there remains minimal examples of this being applied in a marine context, across the globe, that go beyond voluntarily recommendations. What is more, there is no single, universally applicable model for delivering net benefit. Different approaches present distinct opportunities and constraints depending on ecological context, sector and spatial scale, with clear trade-offs between ambition, deliverability and regulatory certainty. For example, fully metric-based approaches offer greater clarity but face significant challenges in marine systems, particularly offshore, due to data limitations and ecological complexity. Whereas qualitative or hybrid approaches, focused on outcomes, ecosystem resilience and strategic restoration, may be better aligned with Welsh marine contexts, provided they are supported by clear guidance and governance. Stakeholder engagement suggests that voluntary approaches alone are unlikely to deliver MNB at scale, while rigid, project-specific requirements may be difficult to apply in practice. Flexible models that combine mandatory participation in principle with proportionate, strategic delivery mechanisms were widely supported. Strategic, off-site delivery and pooled funding were seen as particularly important for addressing cumulative pressures, with transparency and clear governance identified as critical to maintaining confidence.

Overall, the appetite for Wales to pursue MNB is clear, although the scoping study has revealed that this is a complex topic area and it is worth noting that many of the intricacies that will be required if implementing MNB have not yet been developed. Careful consideration would be needed around the form MNB may take, the mechanisms through which it could be delivered, and how it would interact with existing marine planning and licensing processes. This report indicates that approaches which are flexible, proportionate, and capable of evolving over time may be better suited to the complexity of marine systems compared to fixed and highly prescriptive quantitative models.

1. Introduction

Wales's marine environment underpins the nation's environmental health, economic prosperity, and cultural identity. Its seas support internationally important habitats and species, sustain coastal communities, and provide space for a wide range of activities, including ports, fisheries, tourism, marine aggregates, and offshore renewable energy. As pressures on the marine environment increase and new uses continue to emerge, there is growing recognition that approaches focused solely on impact avoidance and mitigation may be insufficient to address cumulative impacts and long-term ecological decline.

In response to these challenges, increasing attention has been given, both within the UK and internationally, to concepts of 'net gain' or 'net benefit', which seek to ensure that development activities contribute positively to environmental outcomes rather than solely limiting harm. While such approaches are now embedded within terrestrial planning systems in parts of the UK (including Wales), their application to the marine environment remains relatively undeveloped. However, given the importance of the emerging concept, particularly in the marine environment, there is a need to examine how an approach could be applied in the context of Welsh waters.

1.1. Purpose of this Report

APEM Group have been commissioned to explore the concept of marine net benefit (MNB) in Wales through a Scoping Study. The purpose of this report is to provide an evidence-based assessment of potential approaches to MNB in Wales and to explore whether, and how, such an approach could be applied within the Welsh marine planning and licensing system. The report draws on a detailed review of relevant policy and literature (Section 4), alongside stakeholder engagement (Section 5). The study then examines a range of practical options of how MNB might be approached (Section 6). In doing so, it considers how any future MNB approach could complement existing terrestrial Net Benefit for Biodiversity (NBB) requirements in Wales and emerging marine net gain (MNG) initiatives within neighbouring English waters.

This report is at an early, scoping stage and does not seek to recommend immediate policy change nor does it constitute a commitment from the Welsh Government to pursue MNB. Instead, it provides a structured foundation to inform future decision-making by identifying implementation considerations associated with MNB. Its aim is to support Welsh Government in determining whether MNB represents a viable and desirable addition to the marine policy framework, and what conditions would need to be in place for it to contribute effectively to the long-term protection, restoration, and enhancement of Wales's marine environment.

This report is structured in the following:

- **Introduction**
- **Marine Policy and Commitments for MNB** – summarises the international and UK-level commitments, goals, and policy drivers relating to nature recovery and sustainable use of the marine environment.
- **The Net Benefit Principle** – introduces the concept of net benefit, clarifying its distinction from mitigation and "no net loss" approaches and its relevance to the marine system.
- **Literature and Policy Review** – reviews and analyses existing net benefit and net gain approaches across the devolved governments and internationally, with a focus on both terrestrial and marine contexts.
- **Stakeholder Engagement** – summarises the stakeholder engagement process as part of this scoping study.
- **Discussion of MNB Approaches** – synthesises evidence from the literature review and stakeholder engagement to assess potential approaches to MNB in Wales and sets out a number of potential approaches.
- **Summary -** draws together the key findings of the study.

2. Marine Policy and Commitments for Marine Net Benefit (MNB)

2.1. International Policy and Commitments

The case for a MNB approach is firmly rooted in global environmental governance. The Kunming–Montreal Global Biodiversity Framework (GBF) (Convention on Biological Diversity (CBD), 2022), adopted at COP15 in 2022, represents a landmark in biodiversity policy, establishing targets to halt and reverse biodiversity loss to put nature on a path to measurable recovery by 2030. Key commitments of the GBF include restoring at least 30% of degraded ecosystems, conserving 30% of global land and sea, and embedding biodiversity considerations across all sectors of the economy. Importantly, the GBF shifts the international agenda away from "no net loss" towards net positive outcomes, providing a strong precedent for embedding enhancement into marine planning and development frameworks. Marine systems are particularly highlighted through Target 2 of the GBF, which explicitly calls for the restoration of coastal and marine ecosystems as critical contributors to climate adaptation, food security, and biodiversity recovery.

Alongside the GBF, the United Nations (UN) Sustainable Development Goals (SDGs) (UN, 2015) reinforce the importance of ocean stewardship. SDG 14: Life Below Water commits UN member states to conserve and sustainably use oceans and marine resources, while SDG 15: Life on Land extends this to terrestrial and coastal ecosystems, many of which directly influence marine health.

The Paris Agreement (United Nations Framework Convention on Climate Change (UNFCCC), 2015) further underlines the global importance of marine ecosystems by recognising their role in climate change mitigation and adaptation. Blue carbon habitats such as saltmarshes and seagrass meadows are increasingly acknowledged as both biodiversity hotspots and carbon sinks, linking the restoration of marine habitats to international climate targets. Taken together, these international frameworks establish both a mandate and an opportunity for nations to embed net positive outcomes in marine policy, of which MNB can play a vital role in.

2.2. UK and Regional Policy and Commitments

Environmental policy in the UK is largely devolved, meaning that England, Wales, Scotland, and Northern Ireland each take their own approach, guided by different laws and priorities. For example, the Marine and Coastal Access Act (2009) provides the overarching framework for marine management across the UK, but its application differs due to devolution. In England and Wales, the Act underpins marine planning, licensing, and conservation; where the latter is concerned, Welsh Ministers hold responsibility for both inshore and offshore waters. In Scotland and Northern Ireland, however, most powers were devolved through the Marine (Scotland) Act (2010) and the Marine Act (Northern Ireland) (2013), which respectively govern inshore waters; for both nations responsibilities in offshore areas and certain reserved matters, such as oil and gas, defence, and shipping, remain with the UK Government. Section 4 will provide a detailed analysis of these differing frameworks and approaches, enabling a comparative understanding of how environmental governance relating to net benefit is pursued across the devolved nations.

These policies also intersect with the UK's obligations under the Marine Strategy Regulations (2010) to achieve Good Environmental Status (GES) (Defra, 2019) in its marine waters. GES represents the overarching goal of ensuring that the structure, functions, and productivity of marine ecosystems are maintained at healthy levels, allowing them to support biodiversity, ecosystem services, and sustainable human use. The UK's GES Framework is assessed through eleven qualitative descriptors covering key aspects such as biodiversity, non-indigenous species, food webs, eutrophication, sea-floor integrity, and contaminants, among others. The GES framework therefore provides a scientific and policy benchmark for measuring environmental performance and delivery of wider objectives, such as climate resilience, and could underpin net benefit in the UK marine environment.

The UK is also a contracting party to regional agreements such as OSPAR, which requires the protection and restoration of marine ecosystems across the North-East Atlantic, further reinforcing obligations to enhance biodiversity beyond minimum standards. The OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Commission, 1992) provides the primary regional framework governing UK, including Welsh, waters, making it highly relevant to the development of MNB. OSPAR has progressively expanded its remit from pollution control to ecosystem-based management, biodiversity conservation, and restoration. Its North-East Atlantic Environment Strategy 2030 (OSPAR Commission, 2021) commits contracting parties, including the UK, to halt biodiversity loss, restore degraded ecosystems, and enhance the ocean's role in climate regulation. This includes the designation of a coherent network of Marine Protected Areas (MPAs), targeted recovery programmes for threatened species and habitats such as seagrass beds and oyster reefs, and the integration of blue carbon ecosystems into climate policy. Importantly, OSPAR places restoration on equal footing with protection, reflecting a shift towards proactive enhancement rather than solely harm prevention. These commitments create a binding regional framework that complements national initiatives, providing both policy legitimacy and potential practical alignment for embedding MNB approaches within UK marine management.

The UK marine commitments are also closely aligned with climate policy, including the legally binding target of net zero greenhouse gas emissions by 2050. Marine ecosystems, particularly blue carbon habitats, are recognised as vital to achieving this target, linking net benefit approaches to both climate mitigation and adaptation. This integrated policy environment demonstrates that net benefit in the marine domain is not an isolated ambition but central to the UK's broader environmental and climate agenda.

2.3. Welsh Policy and Commitments

Within the devolved context, Wales has developed a distinctive policy framework that embeds biodiversity enhancement into a broader vision of sustainable development and ecological resilience. A key piece of overarching legislation is the Well-being of Future Generations (Wales) Act (2015) which is globally unique, requiring all public bodies to act in pursuit of long-term well-being goals that include resilience, prosperity, and environmental health. It sets seven statutory well-being goals, including a resilient Wales and a globally responsible Wales, both of which are directly relevant to biodiversity enhancement. Importantly, the Act requires long-term thinking and prevention, obliging decision-makers to take proactive steps to maintain ecosystem resilience and to consider global environmental impacts when taking local decisions. This Act establishes a duty not only to protect the environment but also to improve it, aligning closely with the principles of MNB.

Similarly, the Environment (Wales) Act (2016) introduced a statutory biodiversity duty on public authorities, requiring them to seek to maintain and enhance biodiversity in the exercise of their functions. Implementation of the Act in the planning system is delivered principally on land through Planning Policy Wales (PPW) (Edition 12) (Welsh Government, 2024a). The Act also embedded the principle of Sustainable Management of Natural Resources (SMNR) (Welsh Government, 2016) into decision-making, ensuring that economic development and environmental enhancement are considered together. SMNR is a statutory requirement for Natural Resources Wales (NRW) and other public authorities and guides how the environment should be managed in an integrated, long-term, and adaptive way.; the nine principles of SMNR are shown in Table 1.

The Environment (Wales) Act (2016) also requires the preparation of State of Natural Resources Reports (SoNaRR), which assess the condition and sustainable management of ecosystems across terrestrial, freshwater, coastal, and marine areas, highlighting key pressures and opportunities for improving resilience and long-term sustainability. These statutory duties are supported and given strategic direction through frameworks such as the Nature Recovery Action Plan for Wales (2020–2030) (Welsh Government, 2015), which sets national priorities for halting biodiversity loss and restoring ecosystems across land and marine, and is directly aligned with the GBFs 2030 goals.

Table 1 SMNR Principles

Principle	Description
Adaptive management	Manage adaptively by planning, monitoring, reviewing and where appropriate, changing action
Scale	Work at the right spatial scale (local, catchment, regional, national) and consider ecosystem boundaries rather than just administrative ones.
Collaboration and engagement	Promote and engage in collaboration and cooperation
Public Participation	Make appropriate arrangements for public participation in decision-making
Evidence	Take account of all relevant evidence, and gather evidence in respect of uncertainties
Multiple benefits	Take account of the benefits and intrinsic value of natural resources and ecosystems
Long term	Take account of the short, medium and long term consequences of actions
Preventative action	Take action to prevent significant damage to ecosystem
Building resilience	Take account of the resilience of ecosystems, in particular the following aspects: • Diversity between and within ecosystems; • The connections between and within ecosystems; • The scale of ecosystems; • The condition of ecosystems (including their structure and functioning); • The adaptability of ecosystems

Marine Planning in Wales is governed under the Marine and Coastal Access Act (2009), which gives Welsh Ministers responsibility for marine planning in Welsh inshore (0–12 nautical miles) and offshore (12–200 nautical miles) waters. The Welsh Government produced the Welsh National Marine Plan (WNMP) 2019 (Welsh Government, 2019) which provides the strategic framework for sustainable use of Welsh seas, provides the statutory basis for licensing and planning (requiring decision-makers to consider opportunities for enhancement alongside economic development), and is directly aligned with SMNR principles (see Table 1). Wales also plays an important role in the UK's wider climate and environmental commitments.

The Net Zero Wales Carbon Budget 2 (2021–25) (Welsh Government, 2021a) identifies blue carbon ecosystems as critical to both carbon sequestration and biodiversity enhancement, highlighting the importance of restoring habitats such as saltmarsh and seagrass. Meanwhile, the WNMP (Welsh Government, 2019) and the Future Wales: National Plan 2040 (Welsh Government, 2021b) embed environmental enhancement within spatial planning at both land and sea, reflecting a coherent policy direction that integrates biodiversity, climate resilience, and community well-being.

The Biodiversity Deep Dive (Welsh Government, 2022) is a key document in Welsh environmental strategy. This report sets out an ambitious roadmap of collective actions for Wales centred around the "30 by 30" goal as part of the Kunming–Montreal GBF (CBD, 2022) which involves protecting and effectively managing 30% of land, freshwater and seas by 2030. Its recommendations span eight major themes designed to strengthen biodiversity conservation, improve ecosystem resilience, and embed nature recovery across policy, planning and public life. Table 2 summarises the eight objectives from the report and their links to the marine environment.

The approach to net benefit in Wales is further analysed in Section 4.2.

Table 2 Biodiversity Deep Dive Objectives

No.	Objective	Description
1	Transform the protected sites series so that it is better, bigger, and more effectively connected	Strengthen the protected area network across land, freshwater, and seas so that sites are bigger, better managed, and more connected. This includes restoring terrestrial habitats such as peatlands and woodlands, alongside improving the condition and connectivity of the MPA network, with a focus on priority habitats like saltmarsh, seagrass, and reefs.
2	Create a framework to recognise Nature Recovery Exemplar Areas and Other Effective Area-based Conservation Measures (OECMs) that deliver biodiversity outcomes	Establish exemplar areas for nature recovery and recognise OECMs where appropriate. In the marine context, this could include fisheries management areas, voluntary no-take zones, or stewardship agreements that deliver measurable biodiversity outcomes outside formal MPAs.
3	Unlock the potential of designated landscapes (National Parks and Areas of Outstanding Natural Beauty) to deliver more for nature and 30 by 30	Unlock the potential of National Parks and AONBs, as well as designated marine areas, to deliver greater benefits for biodiversity. This requires improved action plans, resourcing, and governance reforms so that designated landscapes and seascapes become drivers of both terrestrial and marine recovery.
4	Continue to reform land and marine management and planning (including spatial) to deliver more for both protected sites and wider land / seascapes	Reform marine planning frameworks to embed biodiversity and resilience more firmly into decision-making and strengthen ecological safeguards in the WNMP (Welsh Government, 2019) and ensure cumulative effects are assessed effectively.
5	Build a strong foundation for future delivery through capacity building, behaviour change, awareness raising and skills development	Build the expertise and capacity needed across terrestrial and marine sectors. This includes enhancing skills in ecological monitoring, marine conservation science, and ecosystem management, as well as raising awareness and fostering public engagement with both land- and sea-based recovery efforts.
6	Unlock public and private finance to deliver for nature at far greater scale and pace	Mobilise public and private investment to support nature recovery at scale across ecosystems. This includes scaling up restoration funding, alongside developing new mechanisms for marine and coastal habitats, such as seagrass restoration or natural flood defence projects.
7	Develop and adapt monitoring and evidence frameworks to measure progress towards the 30x30 target and guide prioritisation of action	Develop comprehensive monitoring and evidence frameworks to track progress toward the 30 by 30 target. For seas, it requires addressing significant marine data gaps, particularly in offshore habitats and mobile species, and ensuring monitoring systems can capture both terrestrial and marine trends
8	Embed Nature Recovery in policy and strategy in public bodies in Wales	Embed biodiversity recovery across all public bodies, sectors, and strategies. This includes aligning terrestrial strategies and marine strategies and exploring statutory biodiversity targets that apply equally to land and sea.

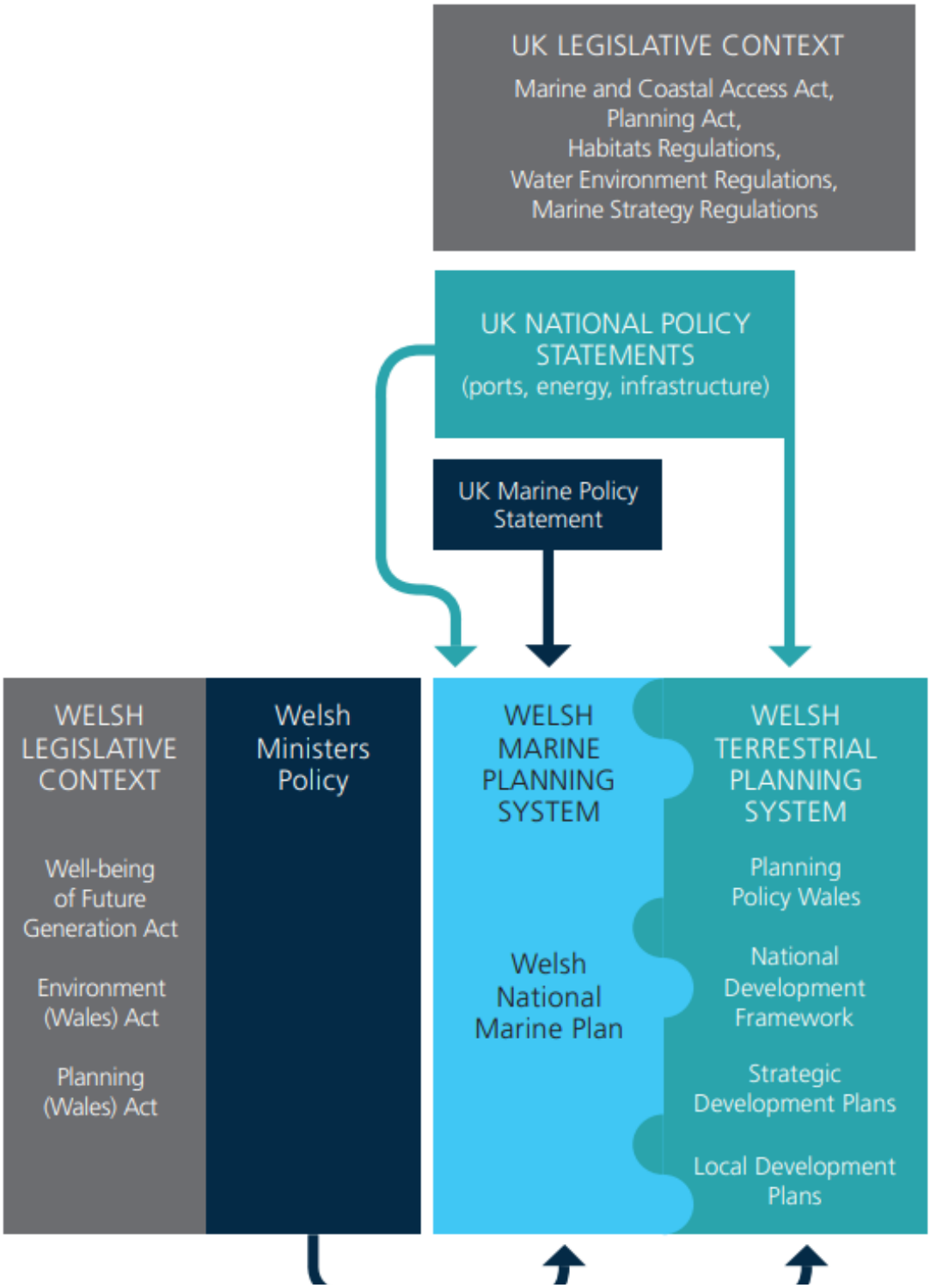


Figure 1 Welsh Marine Planning and Wider Policy Context. Source: Welsh National Marine Plan (2019)

3. The Net Benefit Principle

This section explores the net benefit principle. For the purposes of this report, the term "net benefit" will be used when describing the principle in general terms. However, when the discussion turns to specific initiatives or frameworks, such as Biodiversity Net Gain (BNG) or Net Benefit for Biodiversity (NBB) the formal titles will be used.

Development activities inevitably influence the environment through both direct impacts, such as habitat loss, or indirect impacts such as changes to hydrodynamics. To manage these effects, environmental impact assessments (EIAs) and licensing frameworks are applied, with legal and regulatory requirements often mandating mitigation measures. It is important to note that a clear understanding of net benefit requires recognition of two foundational concepts: no net loss and net benefit. As depicted in Figure 2, for no net loss of a site to be achieved the development must follow the mitigation hierarchy. To achieve a net benefit, further contributions are required. Within this context, no net loss represents the principle that all adverse and residual impacts should be fully offset, leaving the environment in at least the same state as before development. Net benefit, however, extends beyond mitigation by aiming to enhance environmental conditions, for instance, by increasing tree cover or seagrass meadow coverage (on-site or off-site) compared to pre-development levels.

It should be noted that Figure 2 provides a simplified representation of the mitigation hierarchy, comparing "no net loss" and net benefit principles for illustrative purposes. It is not intended to represent all steps, complexities, or project-specific considerations involved in practice. It also does not cover the separate, legally defined processes that apply to protected sites under relevant conservation legislation.

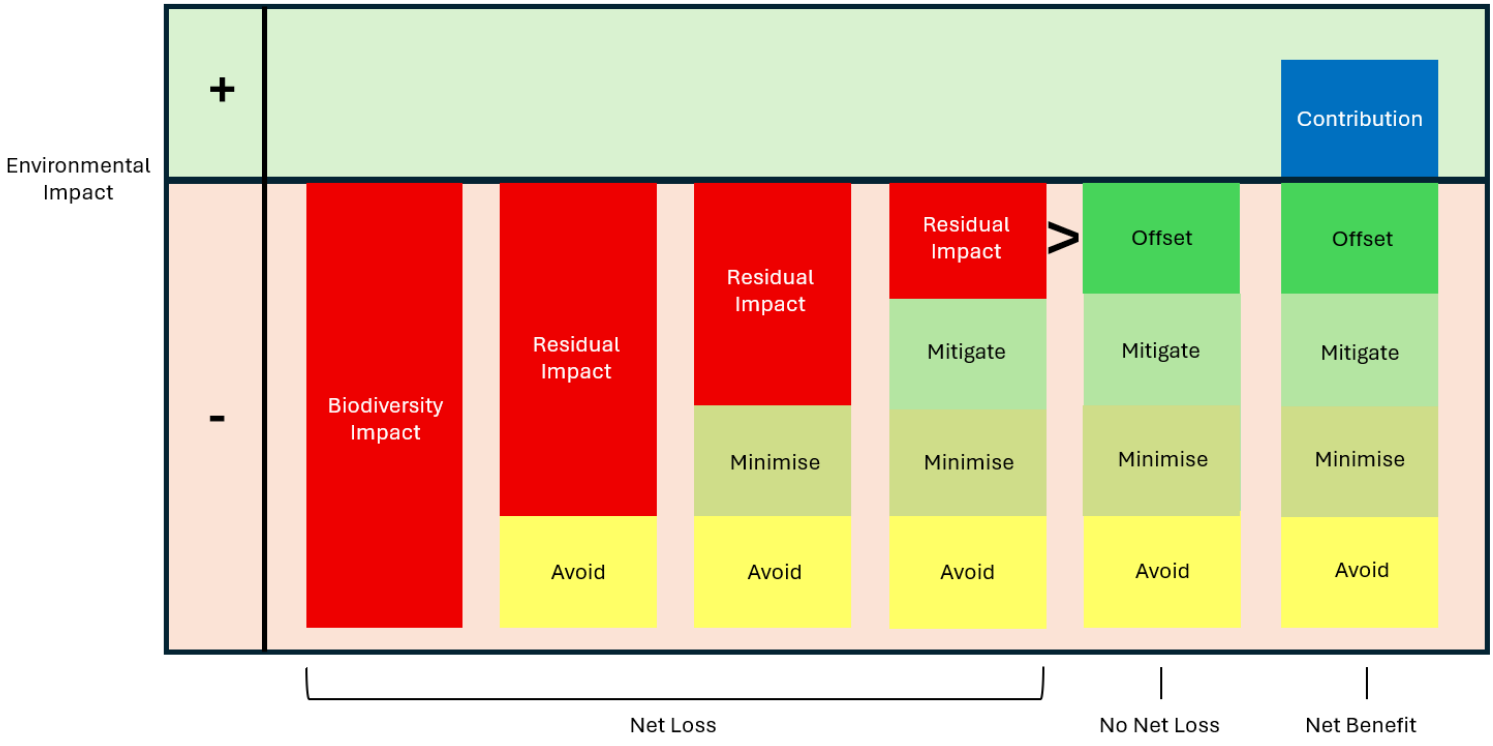


Figure 2 No Net Loss vs Net Benefit

Terrestrial net benefit is a more established and widely applied concept, with clearer methods for measuring habitat quality, connectivity, and species outcomes on land. In contrast, marine net benefit (and similarly termed approaches) is less developed and still emerging as a practice, reflecting the greater complexity of marine systems, where habitats are dynamic, species are highly mobile, and outcomes are harder to monitor. While both share the principle of leaving the environment in a better state, terrestrial approaches benefit from a longer track record of application, whereas marine approaches are still evolving in response to scientific and practical challenges. Within both of these environments, net benefit is seen as a key mechanism which may support contribution to the "30 by 30" goals both domestically and under international targets such as the Kunming–Montreal GBF (CBD, 2022).

While biodiversity offsetting and no net loss policies are well-established in environmental regulation globally, explicit commitments to net gain/benefit are less common, particularly within marine and coastal systems. The UK has pioneered discussion of net benefit, but comparable approaches are emerging elsewhere through regulatory frameworks, voluntary markets, and pilot programmes. In addition, Positive Environmental Outcome (PEO) Plans, managed by The Crown Estate for Round 5 Celtic Sea offshore wind projects, require developers to deliver measurable environmental benefits alongside project development. Section 4 analyses how the principles underpinning net benefit are applied across the devolved governments. The current approaches internationally are also explored.

4. Literature and Policy Review

4.1. Analysis of MNB Approaches

This section analyses how the principles underpinning net benefit are implemented across the devolved governments (Wales, England, Scotland and Northern Ireland) in both a terrestrial and a marine context (where applicable). It is important to note that globally the net benefit principle is lacking (especially in a marine context) and therefore the analysis framework has only been applied to the four UK nations to avoid repetition when assessing against a no-net loss principle which is commonly applied internationally. The review will then investigate approaches more generally and analyse a qualitative approach vs a quantitative approach and voluntary vs mandatory initiatives. International approaches are explored separately in Section 4.7.

4.1.1. Analysis Methodology

To provide a consistent and comparative evaluation of net benefit approaches, a balanced framework has been developed. This framework recognises the need to assess both quantitative, metric-based systems (e.g., statutory biodiversity metrics) and qualitative approaches. To reduce bias towards metric-based approaches, the criteria explicitly recognise the value of qualitative frameworks as legitimate mechanisms, even where no numeric metric exists. The qualitative vs quantitative approach is explored separately in Section 4.6.1.

The analysis is broken down between terrestrial and marine due to the different governance, policy and general approaches taken in these environments. Generally, policy and approaches to net benefit are more advanced on land than they are in a marine context and this is reflected in the analysis. Intertidal habitats are at the interface between these environments; however, they are treated primarily within terrestrial regimes because planning, development, and enhancement measures in intertidal zones are often governed by terrestrial planning permissions, landowner responsibilities, and offsetting mechanisms.

4.1.2. Analysis Criteria

For the analysis of net benefit approaches across the devolved governments, eight key criteria were identified to be assessed against, as shown in Table 3. Each of the eight key criteria are assessed against their current implementation status in legislation, policy and delivery frameworks. Implementation status is noted as follows:

- **Emerging** - The concept, guidance, framework or mechanisms are at an early stage of development, with non-existent, limited or inconsistent application.
- **Establishing** - The concept, guidance, framework or mechanisms are partially developed and recognised in policy, with some tools, processes, or guidance in place.
- **Embedded** - The concept, guidance, framework or mechanisms are fully developed and consistently applied, with strong statutory or policy foundations.

It should be noted that these three descriptions represent the broad implementation status of each criterion. Further specific definitions are provided under each criterion and implementation status as shown in Table 3.

Table 3 Key Assessment Criteria for the Net Benefit Analysis

		Implementation Status		
Criteria	**Description**	**Emerging**	**Establishing**	**Embedded**
Legal/Statutory Basis	This relates to whether the net benefit principle is embedded in law, policy, or voluntary guidance.	Early stage of development with ad hoc or voluntary only implementation	Partially policy led and not statutory	Well developed with strong statutory and legal integration / mechanisms
Policy Integration and Scope	The extent of integration into national strategies, planning frameworks, and ecosystem management.	Limited reference in policy	Incorporated in some policies and programs	Fully integrated across relevant national, regional, and sectoral policies and strategies
Implementation Mechanisms	Are there tools for delivery, such as planning conditions, biodiversity metrics, or registries.	No formal tools or systems in place; implementation inconsistent	Some tools or guidance available but lacking standardisation or uptake	Comprehensive set of operational tools, metrics, and governance structures in use
Measurement Approach	Reliability of how net benefit is measured (quantitative metrics, qualitative assessments, or hybrid approaches).	Largely subjective using limited data or baselines	Combination of qualitative and quantitative approaches improving reliability	Standardised, evidence-based quantitative methods with transparent reporting
Long-Term Security and Monitoring	What is the legal duration of net benefit measures, monitoring mechanisms, and enforcement.	Measures short-term or voluntary, with weak enforcement	Medium-term security, project-based monitoring with some enforcement	Long-term legally binding commitments with ongoing monitoring and adaptive management
Alignment with National/International Targets	Consistency with national biodiversity strategies, climate policies, and global frameworks.	Weak or no alignment with broader targets	Partial alignment. Targets referenced but not explicit	Strong and explicit alignment with national and international biodiversity goals
Funding mechanisms	Presence of dedicated financial instruments to support net benefit delivery, including voluntary funds, grant schemes, or industry contributions.	No dedicated funding; reliant on project-level budgets or voluntary contributions	Some funding options exist but are fragmented or unpredictable	Dedicated, stable funding mechanisms embedded in policy and practice
Implementation in Practice	Practical limitations and public, industry, or stakeholder perception	No active mechanism to feedback on or significant weaknesses identified and poor perception or uptake	Moderate weaknesses with mixed perception and limited confidence	Little to no weaknesses and generally perceived well by public, industry and users

4.2. Wales

Wales has adopted a more flexible and principle-based approach to biodiversity and ecosystem enhancement, emphasising voluntary measures, ecosystem resilience, and nature-positive outcomes. Much of the Legislation and Policy governing this has been previously detailed in Section 2.3 and illustrated in Figure 1. However, the practical delivery of both terrestrial and marine net benefit approaches is considered in more detail below.

4.2.1. Terrestrial

Net benefit in Wales is well developed within a terrestrial context which also extends to the intertidal zone (down to the Mean Low Water Mark (MLWM)). The Environment (Wales) Act (2016) (Section 6) places a duty on public authorities to "*seek to maintain and enhance biodiversity*" and to "*promote the resilience of ecosystems*," and this duty frames expectations across land-use and sectoral decisions. Implementation in the planning system is delivered principally through PPW (Edition 12), which requires development to avoid significant loss, follow the mitigation hierarchy (Figure 2) and deliver a demonstrable, long-term net benefit for biodiversity, preferably on or immediately adjacent to site.

On land, Wales promotes resilience-based assessment and structured ecological evidence to demonstrate net benefit for biodiversity (NBB). Frameworks and tools are used by Welsh Government and Natural Resources Wales (NRW), such as the DECCA Framework (Chartered Institute of Ecology and Environmental Management (CIEEM), 2022), which is structured around five key attributes: Diversity, Extent, Condition, Connectivity, and Adaptability to Change. These attributes are derived from the Environment (Wales) Act (2016) and are intended to guide decision-makers, developers, and regulators in evaluating how plans or projects affect the capacity of ecosystems to adapt, recover, and continue providing benefits.

In practice, DECCA is used to establish a baseline of ecosystem resilience, identify where pressures or weaknesses exist, and design or assess interventions that will deliver measurable improvements. For example, ecological assessments may show how a proposed habitat restoration improves extent and connectivity of woodland, or how management actions strengthen the condition of grasslands. Planning authorities and developers use the framework to demonstrate how projects deliver a NBB as required under PPW, while regulators apply it to ensure that proposed enhancements are credible, proportionate, and targeted at resilience outcomes. Importantly, DECCA is not a metric but a principle-based evaluation tool. This emphasises professional judgement, measurable outcomes and resilience attributes rather than prescribing a single metric as is required in England under BNG (see Section 4.3.1).

Whilst the DECCA framework is qualitative, a metric can be submitted to provide evidence and a supplementary overview if preferred but will not necessarily demonstrate compliance with planning requirements. Local Planning Authorities (LPA's) will consider whether a net benefit for biodiversity has been secured. This qualitative approach also gives practitioners flexibility to consider site-specific ecological evidence while aligning with wider Nature Recovery Action Plan goals and NRW guidance. It is therefore applied across local planning, natural resource management planning, and project-level assessments, making it central to how the net benefit principle is implemented in Wales.

Table 4 assesses the approach to net benefit in Wales on land. Overall, it performs moderately to strongly, with biodiversity enhancement duties embedded in the Well-being of Future Generations Act and Environment (Wales) Act (2015), ensuring cross-sector policy integration. However, no statutory net benefit threshold exists, and monitoring is inconsistent. In addition, funding relies on government grants and planning obligations rather than a structured credit market.

Table 4 Status of a Net Benefit Approach in Wales (terrestrial)

Dimension	Status	Justification
Legal/Statutory Basis	Establishing	The Environment (Wales) Act (2016) and the Well-being of Future Generations (Wales) Act (2015) give statutory backing to biodiversity enhancement as part of sustainable development duties which is now a requirement (and national planning policy) under PPW (edition 12). However, there is no specific, quantified net benefit requirement akin to England's 10% threshold, meaning enforcement depends heavily on local interpretation.
Policy Integration and Scope	Embedded	Biodiversity enhancement duties are embedded across all public bodies via the Well-being of Future Generations (Wales) Act (2015) and is now a requirement (and national planning policy) under PPW (edition 12). This cross-sector integration ensures biodiversity considerations are mainstreamed into planning, infrastructure, and government action, supported by the Nature Recovery Action Plan.
Implementation Mechanisms	Establishing	Delivery is achieved through planning conditions and obligations. Local authorities can require biodiversity enhancement as part of development consents, but there is no centralised monitoring system or registry.
Measurement Approach	Establishing	Enhancement is assessed through planning applications and ecological surveys through the qualitative DECCA Framework (CIEEM, 2022), but no national biodiversity metric exists.
Long-Term Security and Monitoring	Establishing	Enhancements are often secured via planning obligations, but enforcement and monitoring vary significantly between local authorities.
Alignment with Targets	Embedded	Strong integration with the Well-being of Future Generations (Wales) Act (2015), the Nature Recovery Action Plan (Welsh Government, 2015), and international biodiversity commitments such as 30 by 30, with the Biodiversity Deep Dive (Welsh Government, 2022) help setting out how this can be achieved.
Funding Mechanisms	Establishing	Funding is drawn from government-led green infrastructure programmes, environmental grants, planning obligations, and developer contributions, but lacks a structured credit market.
Implementation in Practice	Establishing	The DECCA framework (CIEEM, 2022) is in place and provides a structured approach. However, its application has been noted to be inconsistent across different local authorities due to varying interpretations and resource availability (British Ecological Society, 2023).

4.2.2. Marine

In the marine context, Wales embeds some of the principles which underpin net benefit within its marine planning and management framework. The WNMP (Welsh Government, 2019) and associated implementation guidance set out sustainable development objectives and require developers and regulators to consider impacts on marine ecosystems and designated sites, with NRW providing marine advice and sector-specific guidance for impact assessment, consenting and mitigation. As previously discussed in Section 4.2.1, NBB covers the intertidal marine environment down to the MLWM meaning developments in this zone sit at the interface of terrestrial and marine planning systems. As a result, proposals may need to comply with both PPW (Edition 12) requirements and marine-planning policy, ensuring alignment between land-based planning duties and marine environmental protection.

The WNMP (Welsh Government, 2019) covers both the inshore (0–12 nautical miles) and offshore (12–200 nautical miles) marine areas. The WNMP takes a phased approach and emphasises that the application of its policies should be proportionate to a project's scale, potential impacts, and associated risks. Assessment and engagement requirements are scaled accordingly, with encouragement for public authorities to categorise proposals into risk-based bands to guide decision-making. For example, in relation to marine licensing, low-risk projects (Band One) require minimal supporting evidence, medium-risk projects (Band Two) require some evidence proportional to risk, and high-risk projects (Band Three), including those subject to formal assessment processes, require substantial evidence demonstrating policy compliance. Proposals in Bands Two and Three should explicitly identify relevant policies, the extent of compliance, and contributions to the Plan's vision and objectives. This tiered approach ensures consistent, proportionate application of Plan policies while facilitating practical and transparent project assessment.

WNMP policy ENV_01 (Welsh Government, 2025a) states that all proposals should demonstrate how they will avoid significant adverse impacts on marine biodiversity and natural resources and explicitly encourages decision-makers and developers to seek opportunities to contribute positively to ecosystem resilience. This dual emphasis of minimising harm and enhancing ecological value directly reflects the statutory duty in the Environment (Wales) Act (2016), Section 6, which obliges public bodies to maintain and enhance biodiversity while promoting resilience.

In practice, ENV_01 guides regulators, such as NRW and the Marine Management Organisation (MMO); when engaging with cross-border Wales-England decisions, to assess whether proposed activities can deliver wider benefits beyond compliance. This might include measures such as enhancing the condition of adjacent habitats, restoring connectivity within the Marine Protected Area network, or improving ecosystem functions like water quality and sediment regulation. By embedding these expectations across all marine sectors (from energy and aquaculture to ports and recreation) the WNMP (Welsh Government, 2019) ensures that enhancement opportunities are considered systematically rather than in an ad hoc manner. Similar to the terrestrial context, ENV_01 does not prescribe a numerical gain but instead promotes a principle-based approach, encouraging professional judgement and project-specific solutions that align with Welsh national objectives for nature recovery and resilient seas, although there is no current equivalent to the DECCA framework (CIEEM, 2022) or requirement to deliver nature positive measures. This makes it the key mechanism through which the WNMP translates high-level statutory duties into operational expectations, shaping marine development in a way that supports long-term ecological health and representing an opportunity to deliver net benefit in the marine environment.

Recently, the ENV_01 Technical Statement (Welsh Government, 2025a) has been produced, which is designed to support the effective and consistent implementation of WNMP policy (Welsh Government, 2019), ENV_01: Resilient Marine Ecosystems. Enhancement is specifically encouraged within ENV_01, but the Technical Statement emphasises that this is a voluntary aspect of the policy. To determine whether enhancement has been achieved, ENV_01 encourages applicants and decision makers to measure the scale of enhancement delivered. ENV_01 does not require the provision of marine net benefit for biodiversity by a project, equivalent to the net benefit for biodiversity requirement outlined within the terrestrial planning system's Planning Policy Wales. It is important to note that any interventions implemented under the 'enhancement' element of ENV_01 are separate from and additional to any nature positive measures taken to mitigate adverse impacts on marine ecosystems under the first element of the policy.

Marine policy in Wales therefore shares the same outcome-driven, resilience-oriented principles found on land, and a recent Welsh Biodiversity Deep Dive has sought to integrate marine considerations into national biodiversity policy. Whilst the net benefit practice on land is relatively advanced- with explicit planning policy, the Section 6 duty and DECCA Framework (CIEEM, 2022) supporting implementation- marine enhancement in Wales is currently less formalised and largely voluntary. Marine enhancement is encouraged and integrated in marine planning and MPA management but still remains less standardised and consequently harder to measure, and more dependent on bespoke impact assessments, adaptive management and site-level monitoring. Section 6 of this report explores how

MNB could be applied in Wales and provides recommendations for its strategic implementation, should Welsh Government elect to consider the concept further.

Marine Fund Cymru is an important developing Welsh Government initiative. It is designed to attract voluntary investment from developers, philanthropists, and other partners to support the restoration and long-term resilience of Wales's marine and coastal ecosystems. Led by the Wales Council for Voluntary Action (WCVA), the fund aims to complement public funding by financing projects that deliver environmental, social, and economic benefits, such as habitat enhancement, community wellbeing, and nature-based climate solutions. Importantly, the fund provides a practical mechanism for developers to contribute to actions which are consistent with a net benefit type approach (although it does not introduce marine net benefit), enabling them to voluntarily invest in marine and coastal restoration projects that generate measurable positive outcomes beyond regulatory requirements. The fund forms part of Wales's broader ambition to integrate sustainable investment and nature recovery into marine management and aligns with frameworks such as the Well-being of Future Generations (Wales) Act (2015) and the Environment (Wales) Act (2016). In addition, the recently formally established Marine Recovery Fund (MRF) provides a UK-wide statutory mechanism through which offshore-wind developers can contribute to the delivery of strategic compensatory measures for impacts to MPA features, principally to satisfy obligations under the Habitats Regulations, but may also be used to support Measures of Equivalent Environmental Benefit (MEEB) for impacts to Marine Conservation Zones (MCZs) under the Marine and Coastal Access Act 2009 (UK Government, 2025). However, it is important to note that the MRF remains focused on statutory compensation only; it does not establish a net-benefit requirement, even if the pooled, strategic approach may provide insights that could support future Welsh enhancement policy.

The approach to net benefit in Wales in a marine context is assessed in Table 5 below. In its current form, achieving net benefit in Wales is less developed than its terrestrial counterpart, given that no explicit marine net benefit mechanism exists. The WNMP (Welsh Government, 2019) encourages biodiversity enhancement but imposes no enforceable duties. However, delivery is largely discretionary within licensing processes, with no metric or funding framework.

Table 5 Status of a Net Benefit Approach in Wales (marine)

Dimension	Status	Justification
Legal/Statutory Basis	Emerging	The WNMP (Welsh Government, 2019) and subsequent ENV_01 Technical Statement (Welsh Government, 2025a) encourages enhancement and resilience but imposes no statutory net benefit duty on developers. The language remains strategic rather than mandatory, limiting its legal force.
Policy Integration and Scope	Establishing	The WNMP (Welsh Government, 2019) and subsequent ENV_01 Technical Statement (Welsh Government, 2025a) encourage biodiversity enhancement through marine licensing and marine spatial planning. However, scope is limited to guidance rather than enforceable requirements.
Implementation Mechanisms	Establishing	There is no mandatory net benefit requirement. Implementation relies on case-by-case inclusion in marine licensing, without national coordination or monitoring. Industry-specific bespoke enhancement initiatives such as PEO Plans cover the round 5 Celtic Sea Offshore Wind Project in Welsh waters.
Measurement Approach	Emerging	There is no standardised marine metric; decisions are based on project-specific ecological appraisals with no qualitative framework currently in place akin to the DECCA Framework (CIEEM, 2022) for NBB on land.
Long-Term Security and Monitoring	Emerging	Monitoring and security depend on voluntary measures by developers, with no long-term obligations.

Dimension	Status	Justification
Alignment with Targets	Embedded	Strong alignment with national targets, the WNMP (Welsh Government, 2019) (ENV_01) (Welsh Government, 2025a) and international commitments such as 30 by 30, with the Biodiversity Deep Dive setting out how this can be achieved.
Funding Mechanisms	Establishing	Marine projects are largely dependent on public funding, ad hoc grant funding and developer contributions. Marine Fund Cymru has been recently introduced to attract voluntary investment (including developers) to restore and enhance marine and coastal ecosystems to go beyond existing public funding. Wales can also access the UK-wide MRF for offshore-wind compensation, but there is currently no dedicated funding mechanism for delivering wider marine net benefit.
Implementation in Practice	Emerging	No net benefit mechanism formally in place.

4.3. England

England has taken the most formalised and statutory approach to biodiversity enhancement within the UK, embedding BNG directly into its planning system. The approach reflects a policy shift from mitigation alone towards measurable, long-term improvements in habitats and ecosystem services. While BNG is now a legal requirement for terrestrial planning (including intertidally down to the MWLM), Marine Net Gain (MNG) remains at a formative stage, with principles outlined but delivery mechanisms still under development. BNG and MNG are discussed in further detail below.

At the national level, the UK has made a series of ambitious policy commitments that provide the framework for embedding the principles which underpin net benefit in both terrestrial and marine environments. The 25 Year Environment Plan (HM Government, 2018) was the first comprehensive UK strategy to articulate the ambition of leaving the natural environment in a better state for the next generation. It outlined goals for clean seas, healthy habitats, restored ecosystems, and resilient biodiversity. These ambitions were reaffirmed and operationalised through the Environmental Improvement Plan (HM Government, 2023), which provides statutory targets for species abundance, water quality, air quality, and waste reduction. Importantly, both strategies are explicitly linked to international commitments under the GBF (CBD, 2022) and the Paris Agreement (UNFCCC, 2015), ensuring coherence between domestic and global policy frameworks.

Legislative tools underpin these commitments. The Environment Act (2021) introduced BNG in England. Consultations by Defra undertaken in 2022–23 also propose integrating a net gain approach into the marine licensing system under the Marine and Coastal Access Act (2009), supported by the statutory UK Marine Policy Statement (HM Government, Northern Ireland Executive, Scottish Government and Welsh Government, 2011). These instruments already require decision-makers to take account of ecological enhancement opportunities, laying the groundwork for a formalised net gain mechanism in England.

The recent Planning and Infrastructure Bill (2024-26) introduces new environmental mechanisms within a broader effort to accelerate development. It establishes a Nature Restoration Fund, enabling developers to contribute financially toward habitat restoration and environmental mitigation, and introduces Environmental Delivery Plans to coordinate nature recovery at a strategic level which are to be led by Natural England. The Bill also streamlines environmental assessments and consultation processes for major projects, aiming to reduce delays while maintaining oversight through updated guidance and monitoring frameworks. These measures are intended to integrate environmental considerations into the planning process more efficiently while supporting large-scale housing and infrastructure delivery.

4.3.1. Terrestrial - Biodiversity Net Gain (BNG)

England's BNG includes coverage of the intertidal zone (down to the MLWM) which includes habitats such as saltmarshes, mudflats, and sandflats, as captured by the statutory biodiversity metric (Defra, 2023). However, BNG does not extend offshore beyond the MLWM, where it is expected that developments will be captured under the emerging MNG framework (see Section 4.3.2). BNG became a statutory requirement in England under the Environment Act (2021), with the legislation amending the Town and Country Planning Act (1990) through Schedule 7A. Since February 2024, most new planning applications are required to deliver a minimum 10% net gain in biodiversity value compared with baseline conditions. To comply, developers must prepare a Biodiversity Gain Plan that demonstrates how the required 10% uplift will be achieved and secured for at least 30 years, typically via Section 106 planning obligations or conservation covenants. Gains may be delivered on-site through habitat creation or enhancement, off-site via registered biodiversity gain sites, or through purchasing statutory biodiversity credits from the government. These credits are intended as a last resort, ensuring that developers prioritise on-site and local measures before offsetting elsewhere.

Delivery of BNG is supported by the Biodiversity Gain Sites Register (Natural England, 2024), a publicly accessible database documenting off-site gains, covering location, habitat type, and legal security. LPAs are tasked with approving Gain Plans, enforcing conditions, and ensuring compliance over time which provides transparency and accountability by recording the location, type, and legal security of off-site gains. To further align habitat gains with ecological priorities, Local Nature Recovery Strategies (LNRS) were introduced under the same legislation, which identify priority areas for habitat restoration across terrestrial and intertidal environments (down to the MLWM) within the land-use planning system. BNG will also be extended to Nationally Significant Infrastructure Projects (NSIPs) from May 2026, subject to ongoing consultation (Defra, 2025), ensuring consistency across major development schemes, although these requirements apply only to projects consented through the planning regime and do not extend to offshore marine developments licensed under marine legislation.

The biodiversity metric 4.0 (Defra, 2023a) is the latest version of a quantitative tool used to measure and compare the ecological value of habitats before and after development, supporting the delivery of BNG. It translates field survey data into biodiversity units based on habitat type, condition, distinctiveness and strategic significance, with adjustments for spatial and temporal risks that reflect uncertainty and time for compensation actions to reach habitat maturity.

In practice, the metric is applied throughout the project lifecycle to inform planning, design, assessment and delivery. A qualified ecologist first undertakes a baseline habitat survey using the UK Habitat Classification system, assessing each habitat parcel for condition, distinctiveness and local significance. These data are entered into the Biodiversity Metric Calculation Tool, which generates baseline biodiversity unit scores. Proposed post-development habitats are then modelled within the tool to calculate expected gains or losses, with automated risk multipliers accounting for creation difficulty, time lags and off-site delivery distance. The resulting outputs enable project teams to compare scenarios, refine design proposals and demonstrate compliance with the statutory requirement for a minimum 10% net gain. The strengths of this system lie in consistency, accessibility, and integration with the UK Habitat Classification System, allowing biodiversity to be factored into planning and design through measurable habitat-based units. However, the metric remains a proxy for biodiversity, focusing on habitat characteristics rather than species composition or ecological function. Its accuracy depends heavily on survey quality and assessor expertise, and it can oversimplify complex ecosystems, particularly in degraded or dynamic environments. For example, irreplaceable habitats such as ancient woodland cannot be meaningfully represented within the metric and require bespoke treatment. Although there are potential pitfalls associated with the metric, it is exemplary across the world in calculating net gain.

A study by Stuart *et al.* (2025) has provided a comprehensive examination of public perceptions surrounding terrestrial BNG in England, revealing a nuanced landscape of cautious optimism, limited understanding, and conditional trust. Although only a minority of respondents (21%) had direct experience with BNG projects, a majority (58.2%) expressed support for the principle that habitat restoration and enhancement can lead to net biodiversity improvements. This suggests that while the concept resonates with the public, its mechanisms remain poorly understood. Notably, 42.8% of participants accepted the use of standardised metrics to measure biodiversity, despite ongoing debates about their ecological adequacy. Crucially, the study highlights a clear trust gradient: developers (21.8%) and government agencies (24.0%) received relatively low trust scores, whereas wildlife charities (75.6%) and ecological consultants (66.0%) were among the most trusted groups. This trust differential has direct implications for policy design, suggesting that third-party oversight and transparent monitoring may be essential for building and maintaining public legitimacy. Furthermore, over half of respondents (55.6%) stated that a project's environmental impact is acceptable if it achieves BNG, but this acceptance is conditional, dependent on the perceived credibility and effectiveness of the outcomes.

The study recommends four strategic actions to strengthen BNG's public legitimacy (i) improving public understanding through clear communication; (ii) involving trusted actors in delivery; (iii) avoiding reliance on pre-existing biodiversity credits; and (iv) ensuring developers take direct responsibility for compensatory measures.

Overall, the study underscores that BNG's success is not solely a matter of ecological metrics but also of social trust, transparency, and meaningful stakeholder engagement.

The approach to net benefit as currently delivered within England (Terrestrial BNG) is assessed in Table 6 below. BNG rates highly across most criteria, as the Environment Act (2021) makes a 10% biodiversity uplift a statutory requirement, supported by Natural England's metric, a Biodiversity Gain Plan process, and a statutory register of gain sites. Delivery is integrated into the planning system, with options for on-site, off-site, or statutory credits, and long-term security through 30-year covenants. It aligns strongly with the Environmental Improvement Plan (HM Government, 2023) and international biodiversity targets and is backed by a fast-growing biodiversity credits market. However, key weaknesses lie in the complexity of enforcement and questions over whether metrics fully capture ecological outcomes as numerical tools may oversimplify complex ecosystems, focusing on quantifiable features like habitat size or type which might not fully reflect ecological quality, species diversity, or long-term habitat success.

Table 6 Status of a Net Benefit Approach in England (BNG - terrestrial)

Dimension	Status	Justification
Legal/Statutory Basis	Embedded	BNG has been placed on a firm statutory footing through the Environment Act (2021), which amended the Town and Country Planning Act (1990) via Schedule 7A. This makes a 10% biodiversity uplift a legal requirement for nearly all developments from 2024, backed by regulations, guidance, and statutory instruments. The statutory basis is particularly notable because it establishes legally binding duties for developers and LPAs, marking England out as a global leader in embedding net gain into law.
Policy Integration and Scope	Embedded	BNG is integrated into the planning system at multiple levels: local plans, development control, and national frameworks. It also links into wider strategic documents such as the Environmental Improvement Plan (HM Government, 2023), the 25 Year Environment Plan (Defra, 2018), and the UK's international biodiversity commitments. Extension of BNG to NSIPs from 2026 shows the policy's breadth.
Implementation Mechanisms	Embedded	Delivery mechanisms are highly developed. Developers must submit a Biodiversity Gain Plan with gains recorded in the statutory Biodiversity Gain Sites Register. Monitoring is enforced by LPAs. Natural England provides the tools, and government credits act as a backstop. This creates a comprehensive delivery architecture, albeit resource-intensive.
Measurement Approach	Embedded	The Biodiversity Metric 4.05 allows developers to clearly calculate habitat values pre- and post-development providing consistency to Regulators.
Long-Term Security and Monitoring	Embedded	Gains must be legally secured for at least 30 years via conservation covenants or Section 106 agreements, which is a strong safeguard.
Alignment with Targets	Embedded	BNG is framed as central to delivering the Environmental Improvement Plan (HM Government, 2023), helping meet GBF targets, including 30 by 30.
Funding Mechanisms	Embedded	Has a fully operational biodiversity credit and habitat banking markets. Developers can deliver gains on-site, purchase off-site units, or buy statutory credits as a last resort, creating a scalable financial framework.
Implementation in Practice	Establishing	A significant issue is the misuse of the "de minimis" exemption, with 86% of planning applications approved between March 2024 and February 2025 claiming exemptions, potentially undermining the

Dimension	Status	Justification
		policy's effectiveness (The Guardian, 2025). However, the metric has been criticised for over-simplification, undervaluing ecosystem function, and struggling with long-term equivalence of habitats. There is also general scepticism over BNG by the public. Questions also remain over whether LPAs have the resources and expertise to enforce long-term monitoring effectively. Though overall, its implementation is relatively user-friendly for developers and clear for assessing by Regulators.

4.3.2. Marine - Marine Net Gain (MNG)

While England has made significant strides in implementing BNG on land, MNG is currently conceptual and non-statutory. The vision for MNG was first articulated in the 25 Year Environment Plan (Defra, 2018) and reinforced in the Environmental Improvement Plan (HM Government, 2023), both of which emphasise reversing marine biodiversity loss and restoring marine ecosystems. The Environmental Improvement Plan introduced legally binding targets under the Environmental Targets (Marine Protected Areas) Regulations (2023), including a mandate that 70% of designated features in Marine Protected Areas (MPAs) reach "favourable condition" by 2042, with an interim milestone of 48% by 2028. The Marine and Coastal Access Act (2009), along with the Marine Policy Statement (HM Government, Northern Ireland Executive, Scottish Government and Welsh Government, 2011), provide the foundational tools for marine spatial planning. The Marine Policy Statement guides marine planning decisions through the marine licencing system and Regional Marine Plans (Defra and MMO, 2024) developed by the MMO, aiming for integrated and ecosystem-based administration of English marine zones. However, there are recognised gaps in coherence, enforcement, and integration, especially concerning fisheries, licensing consistency, and delivering strategic restoration outcomes.

Although there is no current formal requirement for net gain (as termed in the jurisdiction) in the marine environment in England, focused effort has been taking place to formally develop MNG. The UK Government is developing a MNG framework for England to ensure that marine developments below mean low water deliver measurable biodiversity enhancements, complementing terrestrial BNG obligations. Following a public consultation on MNG's core principles in 2022, the government released its response in December 2023 (Defra, 2023b). This response confirmed the inclusion of both habitats and species, acknowledged the need for wider environmental benefits, and endorsed a contributions-based approach which is essentially a levy on marine developers to fund strategic restoration and enhancement efforts. Importantly, the government clarified that fisheries will be excluded from the scope of MNG due to existing regulatory regimes governing marine resource extraction. The MNG consultation outlined intentions to develop an assessment framework for MNG delivery, proof-of-concept pilot projects, supporting policy and cost-benefit analysis, and determination of legislative powers. Since the consultation, a report by Natural England (2026) has been published; this was released during the final drafting stages of this study and therefore did not inform the stakeholder engagement or the recommendations presented. This report reflects the views, evidence and options available within Welsh waters.

Aside from ongoing work to develop a formal MNG requirement, practical mechanisms to further promote ecosystem recovery have already emerged, particularly in the offshore wind sector. Notably, the MRF has now been formally established through the 2025 Regulations (UK Government, 2025) as a strategic route for delivering compensatory measures for offshore-wind developments to satisfy compensatory requirements under the Habitats Regulations and, where appropriate, to support MEEB for MCZs. In addition, the Offshore Wind Environmental Improvement Package (OWEIP) provides an optional, pooled framework to streamline and scale the delivery of statutory compensation for impacts to MPAs. However, there is also the Crown Estate PEO Plans which are not attributed to compensation. PEO Plans are early-stage, project-specific strategies prepared at the leasing and bidding stage (such as The Crown Estate Round 5 Celtic Sea offshore wind leasing process), through which

developers identify opportunities to proactively enhance environmental outcomes beyond compliance, rather than to deliver statutory compensation.

England's marine planning system operates under the Marine and Coastal Access Act (2009), guided by the UK Marine Policy Statement (HM Government, Northern Ireland Executive, Scottish Government and Welsh Government, 2011), which sets the overarching vision for clean, healthy, safe, productive and biologically diverse seas. The country is divided into regional marine plan areas each containing inshore and offshore plans that establish 20-year objectives for sustainable use, protection, and enhancement of the marine environment. All plans are aligned with the Marine Policy Statement, regional differences reflect local priorities and ecosystem characteristics and proposals that conserve, restore or enhance the marine environment (including biodiversity, habitats and ecosystem services) are supported. The East Marine Plans, among the earliest adopted, are being reviewed to strengthen provisions for natural capital and environmental improvement through a revised sustainability appraisal process (MMO, 2025).

The approach to net gain in England in a marine context is assessed in Table 7 below. In summary, MNG remains at an early stage, with no statutory duty, registry, or metric. Policy frameworks (e.g. 25 Year Environment Plan (Defra, 2018)) and offshore wind pilots promote net positive outcomes, implementation is voluntary, fragmented, and lacks dedicated funding. Alignment with global biodiversity and blue carbon targets is evident, but delivery relies on case-by-case initiatives.

Table 7 Status of a Net Benefit Approach in England (marine)

Dimension	Status	Justification
Legal/Statutory Basis	Establishing	While the 25 Year Environment Plan (Defra, 2018) committed to developing MNG, and Defra ran a consultation in 2022–23 (Defra, 2023), no legislation has yet been enacted although it is in development. Marine developments are regulated under the Marine and Coastal Access Act (2009), which contains duties for sustainable development but no explicit requirement for marine net gain.
Policy Integration and Scope	Establishing	In England, environmental enhancement initiatives are emerging across multiple sectors (namely offshore wind) and broadly align with the UK Marine Policy Statement (HM Government, Northern Ireland Executive, Scottish Government and Welsh Government, 2011) and Marine Plans, yet they lack full integration into a unified regulatory framework.
Implementation Mechanisms	Emerging	Implementation is limited to pilot projects (e.g., offshore wind "nature-inclusive design and PEO plans"), with no mandatory gain plans or registry and rely on voluntary industry participation.
Measurement Approach	Emerging	No agreed metric for marine habitats, but it is recommended that a purely quantitative approach akin to BNG is not appropriate for MNG (Natural England, 2026). Current projects rely on bespoke ecological assessments.
Long-Term Security and Monitoring	Emerging	No long-term security requirements exist yet for marine gains with marine enhancements being voluntary and not legally binding, meaning long-term security cannot be guaranteed.
Alignment with Targets	Establishing	MNG ambitions are linked to GES, blue carbon, climate adaptation, and biodiversity recovery, but at present remain at a framework and policy development stage rather than constituting a statutory or enforceable requirement.
Funding Mechanisms	Establishing	MNG has no statutory credits, and funding remains limited to pilots, research grants or voluntary contributions from developers (largely offshore wind). England can utilise the UK-wide MRF for offshore-wind compensation, but no dedicated MNG funding mechanism is yet in place.
Implementation in Practice	Emerging	Statutory MNG is currently in development. Stakeholder feedback identified the need for clear guidance and appropriate monitoring and enforcement mechanisms to support effective future implementation (Defra, 2023b).

4.4. Scotland

Scotland has not formally adopted net benefit (or similarly termed approaches) as a statutory policy goal, yet it has established a framework that actively supports biodiversity enhancement and the improvement of ecosystem services across both marine and terrestrial environments. The term “biodiversity enhancement” is used rather than “net gain” or “net benefit”.

4.4.1. Terrestrial

In the terrestrial context, biodiversity enhancement within development planning is encouraged but largely voluntary. To support this, NatureScot is developing a biodiversity metric (NatureScot, 2024) tailored to Scotland’s planning system. The metric is intended to help local authorities and developers assess biodiversity outcomes and identify appropriate habitat enhancements through planning applications. However, unlike the fixed-percentage approach used in England, the Scottish system will continue to rely on professional judgement as the primary basis for determining the scale and nature of enhancements. The metric is currently being piloted to supplement, rather than replace, professional judgement, providing a structured tool to inform decision-making and improve consistency while still allowing ecological discretion at the design stage (NatureScot, 2024).

The National Planning Framework 4 (NPF4) (Scottish Government, 2023) encourages developers to incorporate biodiversity enhancement into planning proposals. The framework emphasises that this should occur only after the mitigation hierarchy has been applied (see Figure 2). The Developing with Nature Guidance (NatureScot, 2023) which aligns with NPF4, particularly Policy 3c, emphasises that new developments should conserve, restore, and enhance biodiversity. The guidance offers specific measures such as native planting, creation of wildlife corridors, and habitat improvements, encouraging developers to go beyond simple mitigation and achieve measurable ecological enhancement. This approach supports Scotland’s broader goal of halting biodiversity loss and promoting nature-positive development outcomes.

Complementing these tools, the Scottish Biodiversity Strategy (Scottish Government, 2024a), updated in 2023, and the Scottish Biodiversity Delivery Plan (2024-2030) (Scottish Government, 2024b) provide overarching priorities that link planning, restoration initiatives, and broader ecosystem management. Looking ahead, the Scottish Government is exploring statutory biodiversity targets through a proposed Natural Environment Bill (Scottish Parliament, 2025), which could establish legally binding outcomes for developments. These strategic frameworks provide the context for net benefit approaches even in the absence of statutory mandates. However, until such legislation is enacted, net benefit relies on voluntary measures, planning guidance, and collaborative initiatives.

The terrestrial approach to a net benefit principle in Scotland is assessed below in Table 8. In summary, enhancement is encouraged under National Planning Framework 4 (Scottish Government, 2023) and the Scottish Biodiversity Strategy (Scottish Government, 2024a), and NatureScot is piloting a biodiversity metric. Yet without statutory requirements, progress depends on voluntary and local implementation, supported by public-private nature finance initiatives.

Table 8 Status of a Net Benefit Approach in Scotland (terrestrial)

Dimension	Status	Justification
Legal/Statutory Basis	Emerging	No legal requirement for net benefit. Enhancement is encouraged in the NFP4 (Scottish Government, 2023) and the Scottish Biodiversity Strategy (Scottish Government, 2023a), but implementation remains discretionary. There is policy emphasis on "nature positive by 2045", but without statutory mechanisms, these remain aspirational.
Policy Integration and Scope	Establishing	Net benefit ambitions are woven into planning frameworks (NPF4, Scottish Biodiversity Strategy). Integration across policy spheres is evident, though operationalisation remains limited.
Implementation Mechanisms	Establishing	NatureScot is piloting a biodiversity metric to standardise delivery. While there is no statutory duty, planning guidance increasingly encourages measurable outcomes.
Measurement Approach	Establishing	NatureScot's metric is under trial, offering potential for a more consistent measurement framework in the future.
Long-Term Security and Monitoring	Emerging	Enhancements are voluntary and no requirements for long-term security. Monitoring is project-based rather than systematic.
Alignment with Targets	Embedded	The Scottish Biodiversity Strategy (Scottish Government, 2024a) sets explicit goals for halting biodiversity loss by 2030 and achieving nature-positive outcomes by 2045, strongly linking national ambitions with global commitments.
Funding Mechanisms	Establishing	Investment is supported by government-led restoration programmes and nature finance initiatives.
Implementation in Practice	Emerging	No formal net benefit mechanism in place.

4.4.2. Marine

Marine planning in Scotland is governed by the Marine (Scotland) Act (2010), which establishes the framework for managing Scotland's inshore waters (0–12 nautical miles). For offshore waters (12–200 nautical miles), responsibilities are shared between the Scottish Government and the UK Government, with the Marine and Coastal Access Act (2009) providing the overarching legislative basis. Scotland's National Marine Plan (Scottish Government, 2015) provides the strategic framework for sustainable marine development, promoting activities that protect and enhance the natural and historic marine environment. Under the Marine (Scotland) Act (2010), marine planners and decision-makers are required to further sustainable development, including the protection and, where appropriate, enhancement of marine health. The National Marine Plan encourages compensatory habitat creation or enhancement where harm cannot be avoided, while also promoting proactive measures such as enhancing natural carbon sinks and restoring habitats including kelp beds, biogenic reefs, and sandbanks for flood risk management and coastal protection. In addition, the Scottish Government's Blue Economy Action Plan (Scottish Government, 2022) aims to strengthen the resilience of marine industries while supporting environmental enhancement. It includes grant schemes that encourage projects improving the quality of the marine environment, its biodiversity, and marine products.

Scotland's approach integrates marine and terrestrial strategies within a unified biodiversity framework which helps to ensure that efforts to restore, enhance, and protect ecosystems are mutually reinforcing across terrestrial, freshwater, and marine environments. Whilst terrestrial approaches to net benefit are guided by planning and emerging metrics, in a marine context, the Scottish Marine Environmental Enhancement Fund (SMEEF) (SMEEF, 2025) launched in 2021, is currently voluntary. SMEEF is managed by NatureScot, Marine Scotland, and Crown Estate

Scotland and is a voluntary fund that enables marine users, including shipping, aquaculture, and renewable energy industries, to support habitat restoration and species enhancement. To date, over £4 million has been allocated to projects such as seagrass restoration, invasive species management, and biodiversity monitoring.

In addition, the UK-wide MRF provides a strategic mechanism for delivering compensatory measures for offshore-wind developments, with a Scotland-specific MRF set to be formally open soon and is expected to align with devolved responsibilities (UK Government, 2025). However, it is a tool for statutory compensation rather than net benefit, though its strategic model may help shape future enhancement policy.

The marine approach to a net benefit principle in Scotland is assessed in Table 9. The marine approach benefits from SMEEF which channels voluntary developer contributions to enhancement projects. However, this remains discretionary, without statutory underpinning or a measurement framework.

Table 9 Status of a Net Benefit Approach in Scotland (marine)

Dimension	Status	Justification
Legal/Statutory Basis	Emerging	Although the Scottish Biodiversity Strategy (Scottish Government, 2024a), the National Planning Framework 4 (Scottish Government, 2023), and marine strategies emphasise enhancement, there is no legislative requirement. Policy emphasis on "nature positive by 2045" is significant, but without statutory mechanisms, these remain aspirational
Policy Integration and Scope	Establishing	Net benefit ambitions are woven into planning frameworks (NPF4, Scottish Biodiversity Strategy) and marine management (Blue Economy Vision (Scottish Government, 2022), SMEEF (2025)). Integration across policy spheres is evident, though operationalisation remains limited.
Implementation Mechanisms	Establishing	SMEEF pools voluntary contributions from marine developers to fund projects such as seagrass and saltmarsh restoration. While promising, contributions are discretionary, limiting scale.
Measurement Approach	Emerging	No metric is currently used to quantify biodiversity uplift.
Long-Term Security and Monitoring	Emerging	Monitoring and security depend on voluntary measures by developers, with no long-term obligations.
Alignment with Targets	Embedded	Scottish Biodiversity Strategy (Scottish Government, 2024a) sets explicit goals for halting biodiversity loss by 2030 and achieving nature-positive outcomes by 2045, strongly linking national ambitions with global commitments.
Funding Mechanisms	Establishing	SMEEF channels voluntary developer contributions to marine enhancement, but scale and consistency remain limited. A Scotland-specific MRF is proposed to provide a coordinated funding route for statutory offshore-wind compensation, though no dedicated mechanism for net benefit currently exists.
Implementation in Practice	Emerging	No formal net benefit mechanism in place.

4.5. Northern Ireland

As of 2025, Northern Ireland has not yet introduced mandatory net benefit requirements akin to those in England and are at an earlier stage when compared with the progress being made by Wales (NBB) and Scotland (NatureScot's biodiversity metric). However, the term "net gain" is referenced in policy and guidance. Biodiversity planning in Northern Ireland has faced significant challenges post-Brexit, particularly due to the absence for a period of a functioning Executive and Assembly, which has hindered legislative progress and environmental governance (Simpson, 2023).

Planning has the potential to contribute to biodiversity conservation and enhancement but achieving this requires targeted legislative changes and stronger governance structures. In Northern Ireland, a 2024 assessment by the Office for Environmental Protection highlighted persistent gaps in data and monitoring, noting that pressures such as land-use change, agriculture, and resource extraction continue to drive biodiversity loss (Office for Environmental Protection, 2024). This underscores the challenge of delivering measurable biodiversity outcomes without statutory obligations or a unified delivery mechanism. Looking forward, the alignment of terrestrial and marine strategies under the Environmental Improvement Plan and future biodiversity legislation could provide the basis for a more coherent and enforceable net gain framework in Northern Ireland.

4.5.1. Terrestrial

In the terrestrial context, biodiversity considerations are reflected in Local Development Plans and Green Infrastructure Plans, where enhancement is encouraged but remains largely voluntary. Similar to Wales and Scotland, delivery mechanisms in Northern Ireland rely on planning guidance, policy integration, and local authority initiatives rather than a fixed metric. The Wildlife and Natural Environment Act (Northern Ireland) (2011) places a legal obligation on public bodies to "*further the conservation of biodiversity when carrying out their functions… and to look for opportunities to enhance or restore biodiversity, or provide an educational input to others about biodiversity*." To meet this duty, new projects must apply the mitigation hierarchy and outline, through an action plan, how habitats will be protected, mitigated, or restored. Any proposed additional enhancements should also be incorporated. The Environmental Improvement Plan for Northern Ireland (DAERA, 2024a) also sets out long-term ambitions for "*thriving, resilient and connected nature*," framing biodiversity enhancement as an integral component of sustainable development. This is disseminated into localised strategies which provide additional direction by promoting conservation, community engagement, and ecological restoration at the district scale. Together, these frameworks encourage developers to embed biodiversity enhancement into projects, though in the absence of mandatory net benefit legislation, progress is reliant on voluntary or policy-driven measures.

The assessment of biodiversity or environmental net gain in terrestrial developments is largely qualitative and voluntary. There is no statutory requirement or quantitative metric equivalent to England's BNG regime. Instead, developers may complete a biodiversity checklist (DAERA, 2017) or ecological statements to demonstrate that impacts on habitats and species have been considered and, where possible, mitigated or enhanced. Some land management and agricultural projects undertake voluntary biodiversity and carbon audits, providing baseline data that can be used to show progress over time, but these remain discretionary and are not embedded in formal planning policy.

Overall, the approach to a terrestrial net gain in Northern Ireland is undeveloped as reflected in Table 10. The Biodiversity Strategy 2023–2030 (DEARA, 2023) and planning policy encourage enhancement but stop short of enforceable duties. Delivery mechanisms, monitoring, and funding remain inconsistent and project-based. Effective biodiversity protection in Northern Ireland depends on institutional capacity, informed decision-making, and strategic planning.

Table 10 Status of a Net Benefit Approach in Northern Ireland (terrestrial)

Dimension	Status	Justification
Legal/Statutory Basis	Emerging	The Biodiversity Strategy 2023–2030 (DEARA, 2023) references enhancement and net gain but the lack of statutory duties undermines implementation.
Policy Integration and Scope	Establishing	Net gain is mentioned within the Biodiversity Strategy 2023–2030, but delivery remains inconsistent and dependent on voluntary uptake.
Implementation Mechanisms	Emerging	No dedicated delivery system exists; biodiversity enhancement is encouraged through development control but remains unstructured and inconsistent.
Measurement Approach	Emerging	Monitoring is qualitative, based on ecological assessments and checklists rather than biodiversity accounting tools or frameworks.
Long-Term Security and Monitoring	Emerging	Biodiversity enhancements are not legally secured for the long term and lack consistent monitoring requirements.
Alignment with Targets	Establishing	The Biodiversity Strategy 2023–2030 commits to international biodiversity frameworks but remains mainly silent on enforceable domestic mechanisms.
Funding Mechanisms	Emerging	There is a reliance on small-scale government or Non-Government Organisation (NGO)-led grant funding, with no systemic market or statutory mechanism to ensure long-term financing.
Implementation in Practice	Emerging	No formal net benefit mechanism in place.

4.5.2. Marine

In the marine environment, the draft Marine Plan for Northern Ireland (DAERA, 2018) prepared under the Marine Act (Northern Ireland) (2013) provides the overarching policy framework and the statutory basis for marine planning in Northern Ireland's inshore waters (0–12 nautical miles). For offshore waters (12–200 nautical miles), responsibility is shared with the UK Government, and planning is undertaken under the Marine and Coastal Access Act (2009). It requires public authorities to consider their duty to conserve and, where appropriate, enhance biodiversity when making decisions that affect the marine area. The draft plan emphasises careful planning and design to minimise adverse impacts and maximise opportunities for biodiversity enhancement, particularly in relation to designated sites, protected species, and seascape quality. Wider policy objectives also align with the principles of ecosystem services, supporting sustainable economic development while protecting and enhancing the built and natural environment.

Within the marine environment, assessment of "net gain" outcomes is also qualitative and non-mandatory. Enhancement actions are typically voluntary or negotiated through licensing and planning processes. More recently, Department of Agriculture, Environment, and Rural Affairs (DAERA) has advanced proposals for a Marine Protected Areas Strategy (DEARA, 2024b) and have implemented a Blue Carbon Action Plan (DEARA, 2025), both of which highlight the potential of nature-based solutions to address biodiversity decline and climate change. These initiatives mark an emerging shift towards embedding enhancement principles into marine planning and management, although, similar to Wales and Scotland, statutory net gain mechanisms are not yet in place.

In Northern Ireland, the MRF provides an optional, UK-wide mechanism for delivering compensatory measures for offshore-wind impacts under the Habitats Regulations (UK Government, 2025). It centralises the organisation and funding of compensation, improving consistency across projects. While not a net-gain or net-benefit tool, its structure may inform future marine enhancement policy.

Table 11 provides the marine status for Northern Ireland. Like the terrestrial situation in Northern Ireland, there is a lack of a net benefit approach in Northern Ireland. The draft Marine Plan references conservation and enhancement but work to finalise it is ongoing and marine net gain ambitions remain reliant on voluntary measures and small-scale funding.

Table 11 Status of a Net Benefit Approach in Northern Ireland (marine)

Dimension	Status	Justification
Legal/Statutory Basis	Emerging	The Biodiversity Strategy 2023–2030 (DEARA, 2023) references enhancement and net gain, and the draft Marine Plan (2018) - still being finalised- calls for conservation and enhancement where possible, but the absence of enacted marine planning legislation and the lack of statutory net benefit duties undermine implementation.
Policy Integration and Scope	Establishing	Net benefit is included within the Biodiversity Strategy 2023–2030, but delivery remains inconsistent and dependent on voluntary uptake.
Implementation Mechanisms	Emerging	No dedicated delivery system exists; biodiversity enhancement is encouraged through development control but remains unstructured and inconsistent.
Measurement Approach	Emerging	Monitoring is qualitative, based on ecological assessments rather than biodiversity accounting tools or frameworks.
Long-Term Security and Monitoring	Emerging	Biodiversity enhancements are not legally secured for the long term and lack consistent monitoring requirements.
Alignment with Targets	Establishing	The Biodiversity Strategy 2023–2030 commits to international biodiversity frameworks but remains weak on enforceable domestic mechanisms.
Funding Mechanisms	Emerging	There is a reliance on small-scale government or NGO-led grant funding, with no systemic market or statutory mechanism to ensure long-term financing. Northern Ireland may draw on the UK-wide MRF for offshore-wind compensation, with no separate funding mechanism yet established for broader marine enhancement or net-benefit measures.
Implementation in Practice	Emerging	No formal net benefit mechanism in place.

4.6. Summary of Approaches

A summary of the overall assessment for a net benefit approach across the devolved governments is provided in Table 12. It should be noted that terrestrial approaches, and related implementation, are generally more developed than marine approaches. This is largely due to clear policy being outlined within terrestrial legislation and guidance which provides support for enhancement on land (including down to MLWM), which has subsequently allowed for a more embedded approach to the net benefit principle on land in comparison to the subtidal environment.

Table 12 Status for a Net Benefit Approach Across the Devolved Governments

Dimension	Wales (Terrestrial)	Wales (Marine)	England (Terrestrial)	England (Marine)	Scotland (Terrestrial)	Scotland (Marine)	N. Ireland (Terrestrial)	N. Ireland (Marine)
Legal/Statutory Basis	Establishing	Emerging	Embedded	Establishing	Emerging	Emerging	Emerging	Emerging
Policy Integration and Scope	Embedded	Establishing	Embedded	Establishing	Establishing	Establishing	Establishing	Establishing
Implementation Mechanisms	Establishing	Establishing	Embedded	Emerging	Establishing	Establishing	Emerging	Emerging
Measurement Approach	Establishing	Emerging	Embedded	Emerging	Establishing	Emerging	Emerging	Emerging
Long-Term Security and Monitoring	Establishing	Emerging	Embedded	Emerging	Emerging	Emerging	Emerging	Emerging
Alignment with Targets	Embedded	Embedded	Embedded	Establishing	Embedded	Embedded	Establishing	Establishing
Funding Mechanisms	Establishing	Establishing	Embedded	Establishing	Establishing	Establishing	Emerging	Emerging
Implementation in Practice	Establishing	Emerging	Establishing	Emerging	Emerging	Emerging	Emerging	Emerging

4.6.1. Quantitative vs Qualitative Frameworks

A summary table comparing the key differences between a quantitative and qualitative approach is provided in Table 13 below. Across the devolved governments, a clear divergence has emerged between quantitative, metric-driven approaches and qualitative, principles-based frameworks for delivering net benefit outcomes. England represents the most quantitative model through the BNG system, mandating a 10% uplift calculated via a biodiversity metric and legally secured for 30 years. This approach has the advantage of clarity, consistency, and enforceability, providing developers, regulators, and investors with a transparent framework for compliance and market development. However, the reliance on standardised metrics risks oversimplifying ecological complexity and undervaluing outcomes that are difficult to quantify, such as ecosystem function, connectivity, or cultural ecosystem services. In contrast, Wales applies the DECCA Framework (CIEEM, 2022) (terrestrial) and SMNR principles (terrestrial and marine) through planning regimes. A qualitative framework-based approach prioritises flexibility, ecological context, and long-term ecosystem resilience rather than fixed numerical targets. While this allows for more nuanced, site-specific decision-making and integration with broader sustainability goals, the absence of binding numerical thresholds or statutory requirements can undermine consistency, monitoring, and accountability. Ultimately, the quantitative model offers precision but risks reductionism, while the qualitative model fosters adaptability but risks vagueness and weaker enforceability.

It is also important to note that when considering the application of a metric-based system in the marine environment there are significant methodological and practical challenges. Unlike terrestrial environments, where habitats and species assemblages are relatively stable and well-documented, marine ecosystems are highly dynamic and often poorly mapped. Establishing reliable baselines is difficult due to natural variability in factors such as currents, salinity, and seasonal species movements, which complicates the measurement of change over time. Data scarcity is another constraint: many marine habitats, particularly offshore or deep-sea environments, have limited ecological monitoring, making it difficult to quantify biodiversity values with confidence. Even in better-studied intertidal systems, metrics may fail to capture ecosystem functions such as nutrient cycling, carbon sequestration, or connectivity with adjacent habitats. In addition, assigning biodiversity units to marine habitats risks oversimplifying ecological complexity, potentially undervaluing critical but less visible features like benthic communities or larval dispersal pathways. Monitoring and verification can also be logistically challenging and costly, given the technical demands of underwater surveys and the difficulty of ensuring compliance at sea. Finally, the cumulative and transboundary nature of marine impacts, where activities in one jurisdiction can affect ecosystems far beyond national boundaries, further complicates the application of site-specific metric systems. For these reasons, while metrics provide clarity and comparability in terrestrial systems, their direct transfer to marine contexts risks both scientific inaccuracy and regulatory ineffectiveness unless carefully adapted.

Table 13 Summary of a Quantitative vs Qualitative Net Benefit Approach

	Quantitative (metric-based)	Qualitative (Framework-based)
Definition	A structured approach that calculates biodiversity values in numerical "units," allowing net benefit targets to be defined, measured, and compared across sites. Typically relies on standardised metrics and mapping tools.	An approach grounded in guiding principles, policies, and expert judgment, where biodiversity outcomes are assessed holistically rather than reduced to numerical values. Enhancement is pursued through planning frameworks and ecological best practice.
Transparency	Provides strong clarity by setting measurable, standardised targets. Developers, regulators, and the public can easily understand whether projects meet requirements. This transparency strengthens accountability and comparability between projects.	Outcomes depend on interpretation and policy context. While it allows more nuanced assessments, the lack of fixed numbers may make results less transparent or consistent, and harder for non-specialists to evaluate.

	Quantitative (metric-based)	Qualitative (Framework-based)
Flexibility	Offers less flexibility, as outcomes are tied to available metrics. Some ecological values (e.g., ecological connectivity) may be excluded, leading to a narrow focus on what can be measured.	Highly flexible, enabling integration of diverse values, including ecosystem services, resilience, and cultural or social considerations. It adapts to local contexts and can capture priorities beyond those covered in a metric.
Accuracy	Can provide robust and repeatable results in well-studied terrestrial habitats where baseline data exists. However, in marine environments, natural variability, incomplete mapping, and data gaps often reduce accuracy, with risks of oversimplification or misplaced confidence in numbers.	Better suited to marine contexts, as it can incorporate expert ecological knowledge, system dynamics, and ecosystem functions (e.g., nutrient cycling, carbon storage). Yet it may lack precision, and outcomes depend heavily on the quality of expert judgment.
Monitoring	Easier to establish standardised monitoring linked to measurable units, but difficult and costly in marine systems where ecological processes are less visible and require specialised technology to track over time.	Harder to monitor consistently due to lack of numerical benchmarks but supports adaptive management which can be more realistic in dynamic marine environments.
Implementation Cost	Requires significant upfront investment to develop and apply metrics, including ecological surveys, modelling, and data verification. Over time, however, it can reduce disputes by providing clear benchmarks.	Typically, lower financial cost since it avoids complex modelling but may increase regulatory burden through the need for case-by-case interpretation and negotiation. Risks inconsistency between projects and regions.
Applicability to Marine	Metrics struggle to capture variability, connectivity, and ecosystem functions of marine systems. Baseline uncertainty and high costs of data collection limit effectiveness, and there is a risk of false precision.	Stronger fit, as it accommodates uncertainty, supports ecosystem-based management, and recognises broader ecological functions. However, qualitative frameworks can lack enforceability and consistency without statutory backing.
Funding Mechanisms	Creates opportunities for biodiversity credit markets, encouraging private-sector investment and long-term habitat banking. However, there are risks of commodification and an overreliance on offsets rather than on-site measures.	More reliant on public funding, voluntary schemes, or developer contributions negotiated through planning. Provides flexibility in funding but lacks the scale and certainty that markets can generate.

4.6.2. Mandatory vs Voluntary Approaches

Mandatory and voluntary approaches to MNB reflect different philosophies of environmental governance and bring distinct strengths and weaknesses.

Mandatory approaches, embedded in law or statutory planning frameworks, provide clarity, certainty, and enforceability. Developers know their obligations from the outset, regulators can track compliance systematically, and outcomes can be scaled across multiple projects. This makes mandatory systems well-suited to delivering national or international biodiversity targets, such as those set under the Kunming-Montreal GBF (CBD, 2022) or OSPAR Convention (OSPAR Commission, 1992). However, mandatory requirements can also be rigid. By relying on standardised benchmarks or metrics, they risk oversimplifying complex and dynamic marine processes, while imposing significant compliance and monitoring costs on both governments and industry.

Voluntary approaches, by contrast, are often more flexible and adaptive. They allow stakeholders to tailor projects to local ecological priorities, community values, or emerging science. Initiatives such as Scotland's SMEEF (2025) illustrate how voluntary mechanisms can unlock industry contributions for restoration, encourage cross-sector partnerships, and support innovative pilot projects. Yet, without statutory backing, voluntary schemes face limitations in scale, consistency, and longevity. Their reliance on goodwill or ad hoc funding makes delivery uneven, while weak monitoring and reporting frameworks reduce accountability. For marine systems, where baseline data are sparse and ecological outcomes are uncertain, voluntary approaches can provide valuable space for innovation and experimentation. However, long-term effectiveness in meeting biodiversity and climate goals is unlikely without some degree of statutory underpinning.

At present, there appears to be a notable alignment between whether a net-gain/benefit system is mandatory or voluntary and whether it is supported by a quantitative or qualitative framework. The only fully mandatory requirement (England's terrestrial (and intertidal) BNG) is also the only system underpinned by a formal metric-based approach. In contrast, all remaining voluntary approaches across the UK currently rely on more qualitative, judgement-led assessments. Although it is important to note that Wales' NBB approach is mandatory through national planning policy and is therefore a material consideration in decision-making, it is, however, not established through primary legislation in the same way as England's BNG. While the sample size is small and causation cannot be claimed, this pattern suggests that establishing a mandatory net-benefit requirement may be more challenging in the absence of a quantitative framework to provide standardisation and certainty. This relationship is not yet conclusively proven but may represent an emerging trend worth monitoring as nations develop their respective approaches.

4.6.3. Sector-Specific Implementation

One of the objectives of this scoping study is to evaluate whether a sector-specific approach could be implemented in a MNB approach. While high-level commitments and national frameworks provide an important foundation, the practical delivery of MNB will ultimately depend on how policies and licensing regimes interact with the specific characteristics, pressures, and opportunities of individual industries. Each sector, whether offshore wind, ports and coastal infrastructure, aquaculture, fisheries, or oil and gas, presents distinct challenges for integration but also unique avenues to contribute positively to marine ecosystems. The current approach to improve the environment by each sector is summarised below. How this could be delivered in practice is detailed in Section 6.

4.6.3.1. Offshore Wind and Marine Renewables

Offshore wind is the sector where nature enhancement principles are most actively being integrated into policy frameworks. The OWEIP, announced in 2022, is designed to accelerate offshore wind deployment while delivering strategic environmental compensation for impacts to features of MPAs (UK Government, 2023). As a component of the British Energy Security Strategy (UK Government, 2022), the OWEIP seeks to streamline the consenting process for offshore wind, with the ambition of reducing determination times from up to four years to around one year whilst upholding existing environmental protections. It establishes a strategic approach to compensation for residual impacts upon MPA features, supported by the MRF, and also outlines proposed standards for nature-based design measures. The programme further highlights the need for strengthened strategic monitoring to better assess cumulative and long-term environmental change. Importantly, the MRF is limited to delivering statutory compensation for impacts to MPAs and does not function as a mechanism for net gain or wider biodiversity enhancement.

Offshore wind projects are increasingly expected to adopt measures that deliver biodiversity benefits alongside energy generation, such as habitat restoration, fishery enhancements, and seabird protection initiatives. The Welsh Government has created the Offshore Wind Task and Finish Group Action Plan (2025–2026), which emphasises the importance of delivering environmental benefits alongside offshore wind development (Welsh Government, 2025b). It highlights the need for projects to contribute positively to the Welsh natural environment, aligning with broader environmental objectives. In addition, PEO Plans, which cover both English and Welsh waters, are managed

by The Crown Estate for Round 5 Celtic Sea offshore wind projects which require developers to deliver measurable environmental benefits alongside project development. PEO Plans focus on enhancing marine biodiversity through actions such as habitat restoration, pressure reduction, land-sea interactions and increasing data and evidence, although it is not yet known how this may align with net benefit approaches. The alignment of Welsh policy with both UK-wide and international standards demonstrates a growing recognition that renewable energy deployment and marine ecological enhancement can be pursued in tandem, positioning Wales as a testbed for innovative, nature-positive offshore wind practices.

4.6.3.2. Ports, Dredging, and Coastal Infrastructure

Policy integration for ports and dredging activities is less advanced and remains more fragmented. In the UK, projects requiring a marine licence under the Marine and Coastal Access Act (2009) are subject to environmental assessment and, under the Habitats Regulations, compensatory measures where designated features are affected. However, enhancement measures are typically negotiated case-by-case rather than systematically required. Coastal infrastructure policies, such as those linked to flood risk management, increasingly recognise ecosystem-based solutions such as saltmarsh and seagrass restoration, but these are framed in terms of climate adaptation and resilience rather than statutory net benefit/gain. Stronger integration between marine spatial planning, shoreline management plans, and investment programmes, under flood and coastal erosion risk management strategies for example, could create a more consistent framework, positioning enhancement as a routine requirement of coastal infrastructure development rather than an optional add-on.

4.6.3.3. Oil and Gas (Decommissioning)

New oil and gas projects in UK waters are increasingly limited under climate transition policies. Therefore, this section focuses on decommissioning which is becoming more common. The oil and gas sector presents a possible opportunity for MNB integration as the North Sea undergoes transition to a post-carbon economy. Current decommissioning policy, governed by the Petroleum Act (1998) and overseen by the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED), requires safe and responsible removal or disposal of infrastructure. Enhancement is not currently a policy requirement, though discussions around “rigs-to-reefs” illustrate growing interest in repurposing infrastructure to provide new marine habitats. This idea could be interpreted as controversial, requiring clear ecological evidence, stakeholder acceptance, and new governance mechanisms. For enhancement to be embedded credibly, statutory guidance would need to link decommissioning approvals to biodiversity outcomes, ensuring that decisions move beyond compliance with safety and liability to actively delivering ecological gain (Nature, 2024).

4.6.3.4. Aquaculture and Fisheries

Aquaculture and fisheries remain areas where there is further opportunity to explore how MNB principles could be integrated. Current regulatory frameworks in Scotland and Wales focus mainly on managing environmental pressures, while broader enhancement activity is voluntary, delivered through initiatives such as Marine Fund Cymru and SMEEF. The UK Fisheries Act (2020) sets sustainability objectives, and there may be scope, working collaboratively with industry, to consider how MNB principles could complement existing aims, for example through optional or incentivised contributions to habitat restoration or nature-positive projects. Such approaches could help strengthen links between resource use and environmental recovery, supporting long-term resilience for both ecosystems and the sectors that rely on them. However, it is important to note that Defra’s response to the MNG consultation, which confirmed that fisheries would be excluded from the scope of mandatory MNG in England due to the challenges of attributing net gain outcomes to diffuse and mobile fishing activities (Defra, 2023b).

4.7. Approaches to Net Benefit Across the Globe

This section examines how a net benefit approach, or similar concepts, has been applied internationally. As there are few examples of a true net benefit approach and most cases focus on no net loss, these examples have not been analysed in the same way as approaches adopted across the devolved governments. It should also be noted that these examples have primarily been applied in coastal and intertidal environments and the application of a net benefit approach beyond MLWS remains limited. Nevertheless, the underlying approaches and the supporting policy frameworks are summarised below.

Ireland has not yet embedded statutory net gain but is exploring opportunities through a National Marine Planning Framework (Department of Climate, Energy and the Environment, 2023) and the new Designated Maritime Area Plan for Offshore Renewables (Department of Climate, Energy and the Environment, 2025) which include strong environmental safeguards. Current commitments remain focused on 'no net loss' under the National Biodiversity Action Plan, but discussions are ongoing around net positive outcomes, particularly in coastal systems such as seagrass beds and shellfish reefs. These approaches are currently voluntary and qualitative, acting as guidance rather than obligations, but provide an important policy hook for future development.

Across the EU, most biodiversity measures are framed around 'no net loss', but several Member States are beginning to embed net benefit objectives directly into development frameworks. The Netherlands is a frontrunner, requiring offshore wind developers to integrate nature-inclusive design into the tendering process which includes measures such as reef cubes or shellfish substrates to create habitats that increase biodiversity beyond baseline (Witteveen and Bos, 2020). This requirement is mandatory, embedded in the offshore wind tender framework, and is assessed using a qualitative principles-based approach rather than a fixed metric. Germany and France are applying similar principles through marine restoration linked to infrastructure projects. Germany's long-standing Eingriffsregelung compensation system is evolving towards net gain and is mandatory within planning and licensing, but delivery is largely quantitative, relying on habitat units and ratios, although it does not yet extend systematically to subtidal systems (Darbi and Wende, 2015). France's initiatives, such as oyster bed restoration in Brittany, are linked to development consents but remain project-specific and qualitative, with no standardised metric (Pouvreau *et al*., 2021). Denmark is piloting eelgrass and blue carbon restoration as part of port and dredging projects. These are voluntary or pilot-stage schemes, integrated into permitting as test cases, and are being assessed through experimental quantitative methods such as carbon and biodiversity uplift accounting (WSP, 2024). Spain has advanced statutory Maritime Spatial Plans and reformed its marine renewables regulation, which incorporate mandatory biodiversity conditions for licensing (Spanish Government, 2023). While not labelled explicitly as net benefit, these are interpreted through qualitative ecological enhancement requirements, and pilot projects are testing quantitative blue carbon metrics for eelgrass and wetland restoration.

Australia has been an early mover in developing biodiversity accounting frameworks that incorporate a net gain principle. The Nature Repair Act (2023) establishes a voluntary national credit scheme based on quantitative metrics, which could extend to ecosystems such as mangroves and seagrass. Victoria's Native Vegetation Management Framework was among the first to explicitly require net gain outcomes in offset trading using a voluntary quantitative habitat-hectare metric (Victoria Department of Natural Resources and Environment, 2002). New South Wales has tightened its Biodiversity Offsets Scheme (New South Wales Government, 2025) strengthening equivalence requirements and introducing quantitative ecological metrics; this system remains mandatory for development projects but includes voluntary enhancements beyond compliance and has growing consideration of coastal and estuarine habitats, reflecting interest in applying net gain to intertidal systems. In New Zealand, while there is no statutory national net gain framework, regional instruments such as the Auckland Unitary Plan, require developers to deliver positive ecological outcomes, especially in coastal habitats (Auckland Council, 2016). These are mandatory at the regional level but assessed largely through qualitative ecological judgment with some emerging quantitative elements for coastal habitats including seagrass beds and oyster reefs.

In the United States, mitigation banking for wetlands is formally based on 'no net loss', but several states and regions have pushed beyond compliance, delivering voluntary net benefit outcomes where restoration exceeds required compensation ratios (USDA NRCS, 2025). These rely on quantitative credit and unit systems under the Clean Water Act (EPA, 1972), making the approach robust and measurable. Canada has historically endorsed 'net gain of habitat' as a policy goal under the 1986 Habitat Policy (DFO, 2001) and Fish and Fish Habitat Offset Policy (DFO, 2019). Fisheries and Oceans Canada encourage restoration-led projects in eelgrass and saltmarsh habitats, where delivery of net benefit is often voluntary and assessed through a mix of qualitative ecological improvement measures and quantitative habitat extent/condition metrics supported by an Ecosystem Approach to Fisheries Management Science Methods Toolbox (DFO, 2025) which helps standardise how environmental variables are integrated into project assessments. In South America, Colombia is notable for its habitat banking system, which was launched in 2017, explicitly requires net biodiversity gains and is mandatory within its legal framework, operating through a quantitative biodiversity credits market that could extend to mangroves and estuarine ecosystems (BIOFIN, 2023).

Uganda stands out as one of the few countries to consider a net gain through the National Environment Act 2019 (Republic of Uganda, 2019) which requires offsets to deliver "no net loss, and preferably a net gain". This requirement is further supported by National Guidelines for Biodiversity and Social Offsets (2022) (NEMA, 2022) and the National Biodiversity Action Plan (2025-2030) (NEMA, 2024), which provides detailed guidelines for implementing biodiversity offsets in development projects. However, the practical implementation of these mandates faces challenges. Enforcement capacity remains a significant hurdle, as the National Environment Management Authority and other regulatory bodies often lack the resources and authority to ensure compliance effectively. Additionally, the assessment of biodiversity offsets combines quantitative metrics, such as offset ratios, with qualitative ecological principles, which has been said to complicate the evaluation of offset effectiveness (WCS Uganda, 2021).

Collectively, these examples show that while statutory net gain mandates for marine systems are still uncommon, there is growing momentum internationally to embed MNB outcomes in policy and practice. Much of the current approach is linked to the recognised value of blue carbon and coastal ecosystems, which provide biodiversity, carbon storage, and coastal protection benefits. In addition to what it being done in the UK, there are emerging quantitative credit markets in Australia, Colombia, and the United States, qualitative planning frameworks in New Zealand, Ireland, and France, and mixed mandatory/voluntary approaches in Germany, Spain, and Canada demonstrate the spectrum of possible models. Although delivery remains uneven, these initiatives signal a broader trend towards integrating net benefit into marine governance. However, focus needs to turn from intertidal and coastal environments to delivering in the subtidal marine environment.

5. Stakeholder Engagement

Stakeholder engagement was a central component of the MNB Scoping Study, ensuring that the analysis is informed by practical experience and reflects the perspectives of those responsible for regulating, delivering, and engaging with marine activities and the natural environment in Welsh waters. The engagement sought to explore views on the purpose and ambition of MNB, explore delivery mechanisms and identify opportunities and risks across sectors, and test expectations around governance, funding, and monitoring. Insights from the stakeholder engagement process directly informed the potential approaches, set out in this report (Section 6). Engagement was undertaken to support an evidence-based assessment of the feasibility, risks, and potential benefits of different approaches, rather than to pre-determine policy outcomes.

The Welsh Government Marine Planning Stakeholder Reference Group (MPSRG) formed the primary forum through which engagement was undertaken. This group includes representatives from regulators, industry, partnerships, seabed user groups and NGOs, providing a broad and balanced range of perspectives. Members of the MPSRG engaged through at least one of the engagement methods (outlined below), with many engaging through all three methods. Views were also collated from wider stakeholders, who attended engagement exercises alongside MPSRG members.

Engagement activities were designed to be inclusive and proportionate, offering multiple routes for participation and enabling stakeholders to contribute via various means. Three complementary methods of engagement were used:

- **A stakeholder workshop** - a hybrid (in person and virtual) stakeholder workshop was held on 4 November 2025 at the Welsh Government Offices in Cardiff.
- **An online survey** - to complement the workshop and provide a route for structured participation. A Microsoft Forms online survey was circulated to all stakeholders. The survey mirrored the themes explored during the workshop and offered an opportunity for more detailed written input.
- **Optional one-to-one bespoke meetings** - recognising that some stakeholders may require space to explore issues in more depth, a limited number of one-to-one meetings were conducted following the workshop and survey.

Together, these methods enabled a broad and representative evidence base, to help develop and inform the potential options, presented in Section 6 below. To encourage open and constructive contributions, responses referred to in Section 6 of this report are presented by sector (for example, government bodies and regulators, developers and industry, environmental organisations, and academia) rather than explicitly naming organisations. This approach enabled the analysis to focus on shared themes and areas of convergence or divergence across sectors, rather than on individual organisational positions.

All raw responses received through the stakeholder engagement process, including survey submissions, workshop outputs, one-to-one meeting notes and any other written contributions made by stakeholders, have been logged and shared with Welsh Government to ensure transparency and to support further review and consideration as part of the policy development process. These notes and other outputs are not provided with this report and, to ensure the confidentiality of the process, are not publicly available supporting information. The notes and other outputs have now been deleted from APEMs records, following the completion of this report. Records will be retained on the Welsh Government's data archive for a period of 3 years following the completion of the contract and will then also be deleted. This will enable evaluation of this contract and outputs and is in line with Welsh Government's data retention policies.

6. Discussion of MNB Approaches

This section provides a structured discussion of the key themes and potential delivery approaches that could underpin future MNB in Wales. It is important to reemphasise that this scoping study does not assume that MNB will be pursued as a policy requirement in Wales.

The discussion within this section draws on the findings of the literature and policy review (Section 4), alongside evidence gathered through stakeholder engagement (Section 5). Where conclusions are drawn, they are based on convergence across stakeholder views rather than isolated comments. Where views diverge, this is explicitly acknowledged.

The discussion focuses on three core themes that recur across existing net benefit/gain frameworks:

- The use of quantitative versus qualitative assessment approaches;
- The application of mandatory versus voluntary mechanisms; and
- The relative merits of project alone (on-site) versus strategic delivery models.

Each theme is assessed against a consistent set of criteria as detailed below:

- **Effectiveness and opportunities** – the extent to which the approach is likely to deliver meaningful and additional MNB outcomes, including wider opportunities to contribute to ecosystem recovery, resilience and long-term improvement.
- **Feasibility** – the practicality of applying the approach in real-world marine planning and licensing processes, including regulatory burden, data requirements, monitoring needs and suitability across different marine sectors.
- **Transferability and alignment** - the degree to which the approach aligns with existing Welsh legislation, policy and governance arrangements, including the WNMP, SMNR, and inshore and offshore regulatory frameworks.
- **Risks and challenges** – the potential barriers to implementation, including legal, ecological, administrative and reputational risks, as well as challenges such as monitoring the effectiveness of long-term outcomes.
- **Support** – the level and nature of support, conditional acceptance or concern expressed through the stakeholder engagement process (Section 5).

Applying these criteria provides a transparent and comparative framework for exploring the potential advantages, limitations, and trade-offs associated with different MNB approaches. They allow the discussion to move beyond theoretical considerations and examine how different MNB approaches may function in practice, supported by a wide range of stakeholder views.

The intention is not to identify a single preferred model at this stage, but rather to inform a balanced and evidence-led consideration of the options available, supporting the development of proportionate and policy-aligned recommendations.

Other important factors that were not easily assessed against the criteria above but require consideration in the context of MNB in Wales (e.g. funding mechanisms), are detailed in Section 6.4.

6.1. Quantitative vs Qualitative

This section examines the relative merits of quantitative (metric-based) and qualitative (principles- or judgement-led) approaches to defining, assessing and evidencing MNB.

6.1.1. Effectiveness and Opportunities

From an effectiveness perspective, a quantitative approach offers the potential advantage of greater clarity, measurability and standardisation. Where well-designed metrics exist, they can provide confidence that a defined uplift has been delivered, enable comparison between projects, and allow aggregation of outcomes at regional or national scales. As described in Section 4.3.1, a prescriptive quantitative approach has been a key driver of England's terrestrial BNG system, where a metric underpins a mandatory minimum uplift requirement. However, marine systems present fundamental challenges to the effective application of a single, universal metric. Subtidal habitats are often poorly mapped, highly dynamic, and influenced by a myriad of pressures operating at spatial and temporal scales beyond individual developments which are difficult to address, particularly offshore. Ecological recovery can also take a considerable time, upwards of many decades, which makes it challenging to attribute change to individual interventions or to demonstrate whether net benefit has been achieved within typical project or monitoring timescales. Marine benefits may be expressed through changes in function or resilience rather than readily measurable structural attributes. In this context, stakeholders repeatedly cautioned that a metric-based approach risks prioritising aspects that fit more easily into a quantitative system, rather than benefits which are ecologically meaningful.

Qualitative approaches, by contrast, offer opportunities to focus on outcomes rather than inputs, allowing decision-makers to consider whether an intervention is likely to deliver real ecological benefit. In Wales, this aligns with existing practice (e.g. NBB and the DECCA Framework as discussed in Section 4.2.1), where marine planning policy already requires proposals to demonstrate how they contribute to ecosystem resilience and recovery rather than meeting strict numerical thresholds. Qualitative approaches can also create space to prioritise pressure reduction, enable strategic restoration, and more easily allow for innovation (interventions that may deliver substantial long-term benefit but are difficult to capture through strict metrics). Sector perspectives reinforce this distinction; developers noted that quantitative systems could incentivise small, visible interventions (e.g. artificial structures) that fit within a metric but may offer limited ecosystem-scale benefit. NGOs similarly emphasised that MNB should not be treated as a purely procedural requirement and not become a compliance-driven exercise.

6.1.2. Feasibility

With regard to feasibility, it is potentially more practical to implement a qualitative or hybrid approach as the data, guidance and capacity requirements associated with a robust marine metric are substantial. Establishing reliable baselines, defining equivalence between habitats, and monitoring change over appropriate timescales would require significant investment and could introduce delays and uncertainty into the marine licensing or planning processes. Regulatory stakeholders noted that monitoring ecological condition at the scale required to support a metric is often constrained by cost, access and safety considerations which is even more difficult in offshore environments. As a result, a metric-based system could inadvertently shift resources away from delivery and towards assessment and reporting, reducing overall meaningful benefit.

Qualitative approaches may be more readily integrated into or alongside existing regulatory processes and allow regulators to exercise professional judgement, informed by available evidence (such as those identified through EIA and the marine licensing process) and strategic priorities, without creating new, standalone metric-based systems. This was widely viewed as more feasible, particularly given current resourcing constraints. That said, several stakeholders acknowledged that a purely qualitative system could create uncertainty for developers if regulator expectations for what constitutes acceptable net benefit and how it should be evidenced are not clearly articulated. In particular, clarity would be needed on the types of measures that qualify as net benefit, the scale or

proportionality of enhancement expected relative to impacts, the evidence required to demonstrate likely effectiveness, and the monitoring or reporting needed to show delivery over time. Whilst a metric-based system was less preferred, stakeholders highlighted the need for sufficient guidance, should a more qualitative approach be implemented, to reduce risks and allow for effective MNB delivery. This highlights the importance of clear principles, decision criteria and examples to support consistent application.

6.1.3. Transferability and Alignment

A qualitative (or hybrid) framework could integrate effectively with Wales's existing legislation and policy, particularly those established under the Environment (Wales) Act 2016 and the associated Section 6 biodiversity obligation as described in Section 2.3. Section 6 places a duty on public authorities to seek to maintain and enhance biodiversity and to promote ecosystem resilience in the exercise of their functions, emphasising outcomes rather than prescribed metrics.

A MNB approach that focuses on qualitative assessment of ecological benefit, resilience, and contribution to recovery would therefore be consistent with the intent and structure of this duty, allowing MNB considerations to reinforce, rather than duplicate or complicate, existing obligations. Such an approach would also align closely with the WNMP, particularly policy ENV_01, which promotes opportunities to enhance ecosystem resilience and deliver nature positive outcomes (see Section 4.2.2). ENV_01 already establishes a decision-making framework that considers ecosystem resilience, cumulative pressures, and the condition of marine features, providing a clear policy hook through which MNB principles could be embedded. At present, however, enhancement under ENV_01 is encouraged rather than required, and its application remains discretionary. Rather than introducing a new standalone statutory requirement, MNB could therefore be required through existing marine planning and licensing processes, using policy interpretation, guidance, and decision-making frameworks to secure additional environmental benefit. By building on established mechanisms, a qualitative (or hybrid) MNB framework would avoid the need for new statutory instruments at an early stage, reducing regulatory complexity and implementation risk. Instead, marine planning and licensing could act as the primary delivery routes, enabling MNB to be applied proportionately, adapted over time, and informed by evolving evidence. However, it should be noted that any move to make such measures mandatory through the WNMP would require a formal review or amendment of the Plan. A phased approach would allow Welsh Government to test and refine MNB in practice while remaining fully aligned with existing environmental duties and the overarching principles of SMNR.

A metric-led approach in a marine context may be less readily transferable, particularly if there is an ambition to closely align with the Welsh terrestrial NBB system (see Section 4.2.1). NBB is underpinned by qualitative, outcomes-focused policy frameworks rather than a single statutory metric and introducing a marine-specific metric may represent a divergence in approach. In the absence of a robust, evidence-based marine metric capable of capturing ecological function, resilience, and long-term recovery, there is a risk that quantitative assessment could conflict with existing marine planning practice and the principles of SMNR. As a result, a standalone marine metric may reduce policy coherence across terrestrial and marine regimes and introduce additional complexity and costs for regulators and developers operating across both systems. This may be more relevant for cross-border projects operating in both Welsh and English waters, where differing approaches could emerge depending on how MNG is ultimately assessed in England, although it is noted that England is less likely to adopt a purely quantitative approach in the marine environment as it does with terrestrial BNG (as discussed in Section 4.3.2).

Overall, the majority of stakeholders preferred to avoid an overly prescriptive model. Whilst some agreed that some elements of quantitative reporting may be required in the longer term, particularly for specific habitat related benefit schemes or for pressure removal schemes, there was little support for adoption of a universal marine metric. Inshore areas, where data availability is higher and interventions are more tangible, may be more amenable to partial quantification in comparison to offshore areas (this is further explored in Section 6.4.6). However, regardless of this, it was broadly considered that a qualitative/hybrid approach is more suitable for transferability and

alignment with existing polices and tools such as NBB and the DECCA Framework which is based on a qualitative framework (see Section 4.2.1).

6.1.4. Risks and Challenges

Both the quantitative and the qualitative approach include a level of risk. For qualitative systems, the primary risks relate to consistency, transparency and defensibility. Without clear guidance, different regulators or decision-makers may reach different conclusions on similar proposals, potentially undermining confidence in the system. There is also a risk that qualitative commitments become vague or difficult to monitor if outcomes are not clearly defined at the outset. For quantitative systems, a notable risk is potential misalignment with ecological reality. Stakeholders repeatedly highlighted that metrics may create a misleading sense of certainty, particularly where underlying data are weak. There was also concern raised that developers may be incentivised to pursue interventions that score well within a metric but offer limited ecological value, or that do not address the most significant pressures on marine ecosystems.

6.1.5. Support

Across the stakeholder engagement programme, there was strong and consistent support for a qualitative or hybrid approach to MNB in Wales. A low number of stakeholders advocated a fully metric-based system at this stage, although it was noted that the preference was driven primarily by a desire for clarity, consistency, and regulatory certainty, rather than a belief that metrics are inherently better at capturing marine ecological outcomes. In fact, a range of stakeholders (across regulators, industry and NGOs) explicitly cautioned against a metric-based approach. Industry based stakeholders valued flexibility and proportionality, noting that qualitative approaches allow MNB to be tailored to sector-specific constraints and opportunities. NGOs emphasised the importance of avoiding overly complicated metrics and instead, maintaining focus on ecosystem recovery. Regulators highlighted that a non-metric system would align more readily with existing processes e.g. the DECCA Framework (as discussed in Section 4.2.1). Importantly, support for qualitative approaches was not framed as opposition to evidence or measurement. Rather, stakeholders expressed a desire for appropriate, proportionate indicators that support accountability without constraining delivery.

6.1.6. Summary

Overall, the evidence indicates that while quantitative, metric-based approaches can offer greater clarity and consistency, their effectiveness in marine environments is limited by ecological complexity, data gaps, and long recovery timescales, particularly in subtidal and offshore systems where outcomes are often expressed through changes in ecosystem function or resilience rather than easily measurable attributes. Qualitative approaches are better aligned with these realities and with existing Welsh marine policy, enabling a focus on outcomes, pressure reduction, and strategic restoration supported by professional judgement. Taken together, the findings suggest that a hybrid approach (grounded in qualitative, resilience-focused principles and supplemented by quantitative indicators where evidence and feasibility allow) may offer the most appropriate and adaptable pathway for delivering MNB in Wales.

6.2. Mandatory vs Voluntary

This section examines whether MNB in Wales would be more effectively delivered through mandatory requirements, voluntary mechanisms, or a combination of both.

6.2.1. Effectiveness and Opportunities

Mandatory approaches are widely recognised as a means of achieving consistency, scale and certainty. Terrestrial systems, such as England's BNG (as discussed in Section 4.3.1), demonstrate that mandatory requirements can drive widespread uptake and embed environmental enhancement into standard development practice. However, the literature and policy review also highlights that mandatory net benefit/gain requirements are rare both in the UK and internationally, particularly in offshore environments beyond the intertidal, which is often picked up through terrestrial requirements (e.g. BNG/NBB). It was also noted during the stakeholder engagement process, across a wide range of stakeholders, that the effectiveness of mandatory approaches in the marine system will depend on whether the mechanism enables delivery at an ecologically meaningful scale.

Whilst mandatory approaches may offer consistency, scale and certainty; voluntary approaches could offer different opportunities. For example, a voluntary approach may allow for innovation and research and development which could allow for new interventions, partnerships and approaches to be tested without the constraints of compliance-driven systems. However, it is unclear at this stage how this would work in practice. Voluntary mechanisms such as Marine Fund Cymru were cited as examples of how funding and collaboration could support restoration and enhancement ahead of formal regulatory change (this is further explored in Section 6.4.5). In support of this, some stakeholders noted that voluntary approaches may be particularly effective in early stages of MNB development, helping to build evidence, confidence and delivery capacity. Sector perspectives varied on the preferred approach; developers generally supported mandatory participation in principle, provided delivery mechanisms are clear and proportionate. However, concern was raised that mandatory requirements could impose disproportionate burdens on smaller operators if not carefully scaled. NGOs and Statutory Nature Conservation Bodies (SNCBs) in particular, emphasised that voluntary approaches alone are unlikely to deliver the scale of change required to address development-related pressures and contribute meaningfully to wider marine recovery.

6.2.2. Feasibility

A new mandatory requirement within the marine licensing and/or planning system could increase complexity, lengthen consenting times, and place additional demands on regulatory capacity which could be particularly acute for sectors with frequent, smaller-scale activities (e.g. small-scale ports and harbours, small construction and maintenance activities, survey and maintenance work and recreational and tourism related developments), where cumulative administrative burden could be significant. For example, routine activities such as small harbour maintenance dredging, cable inspection surveys, or coastal access infrastructure upgrades are often consented under streamlined marine licensing processes or standard conditions. Stakeholders (particularly from developers, operators and user groups) noted that introducing additional project-specific MNB requirements for each of these activities could disproportionately increase regulatory workload and consenting timelines without necessarily delivering commensurate ecological benefit. However, stakeholders from NGOs and SNCBs noted that mandating MNB would introduce feasibility challenges but cautioned that these should not constrain ambition, instead emphasising the role of phased implementation, guidance, and adaptive management in addressing practical barriers. This is an important point, as voluntary approaches can also be difficult to manage in practice, particularly where there is no clear framework for participation, contribution levels, or governance. Also, voluntary schemes often rely on goodwill and leadership from a small number of organisations, limiting reach and durability.

A common theme across stakeholders was that mandatory project-level delivery is less feasible offshore, where project delivery and monitoring are challenging, whereas mandatory contributions to strategic mechanisms may be more practical (see Section 6.3). This reflects existing practice in offshore consenting, where strategic compensation

(for impacts to protected sites), or pooled approaches are increasingly used to address impacts that cannot be effectively managed on a project-alone basis, although it should be noted that MNB should be intended to be additional to any compensation requirement. A recurring suggestion across the stakeholder engagement, was the adoption of a phased or hybrid approach. Under such a model, MNB could initially be introduced through policy-led expectations or guidance, allowing mechanisms to be tested and refined. Over time, once governance arrangements, delivery pathways and monitoring approaches (as required) are established, participation could become mandatory, either through marine planning policy or licensing conditions.

6.2.3. Transferability and Alignment

Wales currently operates within a policy environment that blends mandatory and non-statutory mechanisms. On land, NBB is mandatory through national planning policy rather than primary legislation (see Section 4.2.1) and this could be a relevant approach for MNB as a way of embedding policy levers without immediate statutory change. A hybrid approach would align well with the WNMP, which already sets expectations for environmental protection and enhancement through principles-based policies rather than prescriptive rules (see Section 4.2.2). It also reflects the SMNR framework, which emphasises adaptive management, collaboration and proportionality (see Section 2.3). In contrast, a fully statutory requirement was seen as potentially less readily transferable in the short term, however it was recognised that this should be the aim in the long term. Stakeholders cautioned that attempting to legislate prematurely could reduce flexibility and increase legal risk.

6.2.4. Risks and Challenges

Mandatory approaches could include risks if clear frameworks and guidance are not available and there is potential for regulatory overload, increased costs, and delays in consenting if requirements are unclear or overly complex. There is also a risk surrounding whether obligations are perceived as disproportionate or insufficiently evidenced which could potentially lead to legal challenge and public unease. Voluntary approaches are also not without risks. For example, voluntary approaches may lead to inconsistent uptake, limited transparency, and difficulty demonstrating that outcomes are additional or adequate. Without a clear baseline or expectation, voluntary schemes may struggle to justify their contribution to national recovery objectives. A common concern from stakeholders across both approaches was the risk of confusion between MNB and existing compensation requirements. Stakeholders stressed the importance of clearly distinguishing MNB from mitigation or compensation, to avoid undermining established legal protections.

6.2.5. Support

Overall, stakeholder support tended towards mandatory participation with flexible delivery. Many stakeholders noted that purely voluntary approaches would be insufficient to address the scale of development-related pressures contributing to marine degradation. At the same time, there was limited appetite for prescriptive, one-size-fits-all obligations. Support was strongest for models that require participation but allow choice in how contributions are delivered, particularly through strategic mechanisms. This was seen as offering a balance between certainty and flexibility, and as more likely to maintain long-term stakeholder confidence. Differences in emphasis emerged between sectors, but there was notable convergence around the principle that MNB should not rely solely on goodwill, nor impose disproportionate burdens. Stakeholders repeatedly emphasised clarity, proportionality and transparency as key conditions for acceptance.

6.2.6. Summary

Overall, the evidence indicates that voluntary approaches alone are unlikely to deliver MNB at the scale or consistency required to address cumulative pressures in the marine environment, while fully prescriptive mandatory systems risk introducing complexity and disproportionate burden if poorly designed. Stakeholder engagement suggests strong support for mandatory participation in principle, provided delivery remains flexible and

proportionate. A hybrid model (where participation is required but delivery is enabled through strategic, adaptable mechanisms) was the most supported, balancing effectiveness, feasibility, and alignment with existing marine planning and licensing frameworks.

6.3. Project Alone (On-Site) vs Strategic

This section considers whether MNB outcomes should be delivered by the project alone or through strategic mechanisms operating at broader spatial scales. For clarity, project alone (on-site) delivery is where enhancement measures are secured and implemented within or immediately adjacent to an individual development or activity footprint. Strategic delivery refers to where contributions are pooled or coordinated across multiple activities to deliver interventions at a broader spatial or ecosystem scale.

6.3.1. Effectiveness and Opportunities

Project alone (on-site) delivery offers advantages such as providing a direct spatial and impact link between an activity and enhancement measures, making outcomes more visible and easier to communicate. In certain contexts, such as ports, harbours, or other infrastructure projects, on-site measures may offer opportunities to integrate enhancement through nature inclusive design (NID), or through localised restoration to habitats within the project/development boundary. Stakeholders also noted that on-site delivery can strengthen accountability and ownership, enabling developers to embed enhancement directly into design and construction processes and, in some cases, secure early or immediate ecological benefits alongside development. In these instances, there is a good case for prioritising a project alone (on-site) approach. On-site measures may therefore be particularly appropriate where impacts and opportunities are localised, habitats are well understood, and enhancements can be practically delivered and monitored within the footprint of works. However, stakeholders across sectors emphasised that on-site delivery alone is unlikely to deliver meaningful MNB at scale and that many of the most significant pressures on marine ecosystems (such as habitat degradation, water quality, and cumulative disturbance) are experienced at regional or ecosystem scales that cannot be addressed effectively by individual projects.

Strategic delivery mechanisms may offer opportunities to overcome the limitations of project alone (on-site) delivery. By collective contributions from multiple activities, strategic approaches can target priority habitats, address cumulative impacts, and support interventions that require larger spatial extents or longer timescales. However, there needs to be clear ambition and priorities identified to ensure strategic measures are effective (see Section 6.4.1). Strategic delivery is particularly well suited to interventions such as habitat restoration, invasive species management, pressure reduction measures, and data and evidence generation, which may be less effective, or more likely, not considered at all, if delivered by individual projects alone. Sector perspectives reinforce this view; developers and industry representatives noted that opportunities for meaningful on-site enhancement are limited and often speculative, especially in the offshore environment. NGOs similarly emphasised that visible on-site measures should not be prioritised at the expense of less tangible but more impactful strategic actions.

Taken together, project-alone and strategic delivery could be complementary rather than mutually exclusive, with on-site measures playing an important role where appropriate, but strategic mechanisms necessary to achieve outcomes at scale.

6.3.2. Feasibility

Stakeholders noted that on-site delivery can be particularly effective in inshore or infrastructure-led settings, where access, control over works, and integration with design and construction programmes allow enhancement measures to be incorporated efficiently and with a manageable additional cost. In these circumstances, on-site measures can be straightforward to secure through licence conditions and can provide visible, locally relevant outcomes. However, it was also recognised that project alone (on-site) delivery can be constrained by various logistical and practical

considerations such as safety, engineering, navigational and operational requirements (particularly prevalent offshore). For example, offshore wind developments often face constraints on seabed access, safety zones, and asset protection requirements that can severely limit the scope for in situ habitat enhancement. Although this would not prevent on-site actions entirely, and some opportunities may arise through project specific design and the incorporation of NID to enable the infrastructure to serve as artificial habitat. While on-site measures may be appropriate and practical in certain settings, attempts to rely solely on them may increase project complexity without delivering commensurate environmental benefit, particularly offshore or where impacts are diffuse.

Strategic delivery mechanisms can be designed to operate independently of individual project constraints, allowing interventions to be implemented in locations where success is more likely and potentially targeted at habitats, species, and evidence gaps that most need it. Collective funding approaches can reduce transaction costs, provide certainty for developers, and enable specialist organisations to lead delivery and monitoring, and trial innovations which may result in positive long-term outcomes. Strategic funds were frequently cited as a potential delivery vehicle to facilitate this (see Section 6.4.5). Stakeholders noted the importance of learning from mechanisms such as the MRF in England but emphasised the importance of avoiding duplication or confusion between roles of funding mechanisms e.g. when used for compensation, such as the MRF, as opposed to net benefit/gain. That said, feasibility depends on clear governance arrangements, including the need for transparent processes for allocating funds, selecting projects, and monitoring outcomes. Without these components, strategic mechanisms risk becoming administratively complex or losing stakeholder confidence.

6.3.3. Transferability and Alignment

Project alone (on-site) delivery aligns with the Welsh marine policy context, particularly where impacts and opportunities are localised and enhancements can be secured directly through well-established marine licensing and planning processes, consistent with the Welsh system's risk-based, site-specific and proportionate approach to environmental management (as discussed in Section 4.2.2). Inshore infrastructure projects, such as ports, harbours, or coastal works, may be well suited to embedding enhancement through design, licence conditions, or nature inclusive approaches, allowing measures to be implemented within the footprint of works and closely linked to the source of impact. This can support clear accountability, visibility of outcomes, and straightforward integration with established consenting mechanisms.

Strategic delivery also aligns closely with the Welsh marine policy context, reflecting the WNMP case-by-case, proportionate and principle-based approach to decision-making and its existing use of licence conditions to secure mitigation and enhancement measures. The WNMP also recognises the importance of addressing cumulative effects and supports spatially informed decision-making across inshore and offshore waters (see Section 4.2.2). Strategic MNB mechanisms could be designed to complement this framework by targeting areas, habitats, or pressures identified through marine planning evidence, strategic assessments, or condition monitoring. This approach also aligns closely with the principles of SMNR, particularly those relating to integration, collaboration, working at an appropriate scale, and long-term, adaptive management (see Section 2.3). By operating at a programme or regional scale, strategic delivery can bring together public bodies, developers, and delivery partners to address shared pressures and recovery priorities in a coordinated way, reflecting how marine systems function in practice. Strategic delivery may therefore allow MNB to contribute to broader national objectives, including marine recovery and the achievement of GES, rather than focusing narrowly on project-level outputs.

6.3.4. Risks and Challenges

Both project alone (on-site) and strategic approaches carry risks. For project alone (on-site) delivery, risks can arise where measures are selected primarily for ease of delivery rather than their likely ecological value, potentially limiting overall effectiveness. However, when carefully designed and integrated through mechanisms such as NID or local habitat restoration, project alone (on-site) interventions can deliver tangible, locally relevant benefits and maintain a clear link between impact and enhancement.

Strategic mechanisms should not be seen as a way to avoid responsibility for impacts. Clear safeguards are therefore essential to ensure that MNB is additional to mitigation and any MPA related compensation, and that on-site opportunities are not dismissed prematurely. Governance risks were highlighted by several stakeholders (particularly NGOs), including lack of transparency, unclear accountability for outcomes, and uncertainty over long-term stewardship. Strategic mechanisms should demonstrate how outcomes will be delivered, monitored and protected over appropriate timescales. In addition, there could be a risk that a strategic approach may concentrate investment away from affected communities and that offshore impacts may be defaulted to inshore restoration rather than focusing on the impacted area.

6.3.5. Support

Across all engagement routes, there was strong and consistent stakeholder support for strategic delivery mechanisms as a core component of MNB. In fact, it was unanimous across all stakeholder engagement methods (see Section 5). Whilst stakeholders recognised the value of project alone (on-site) measures in certain contexts, few supported an approach that only relied on project alone delivery. Support for strategic delivery was particularly strong among regulators, offshore industries and environmental NGOs, reflecting shared recognition of marine system complexity and the need for scale. Some developers and industry stakeholders favoured project alone (on-site) measures where they are clearly feasible and proportionate, particularly in inshore contexts or where enhancements could be integrated into project design. However, those stakeholders who favoured on-site measures acknowledged that strategic options are essential where on-site opportunities are limited. However, stakeholders repeatedly emphasised that strategic mechanisms must be well governed, transparent, and demonstrably effective and that without sufficient safeguards, confidence in MNB could be undermined.

6.3.6. Summary

Overall, the evidence indicates that project alone (on-site) delivery of MNB on its own is unlikely to achieve meaningful, larger scale ecological outcomes in the marine environment, particularly offshore where space, safety, and ecological processes constrain what can be delivered within individual project footprints. Strategic delivery mechanisms offer a greater potential to address cumulative pressures and deliver restoration and enhancement at ecologically relevant scales, while also potentially improving feasibility for developers. A tiered approach (prioritising strategic delivery while retaining flexibility for project alone measures where appropriate) may be the most effective and proportionate model for Wales as this will align with current marine planning practice and will help to support long-term ecosystem recovery.

6.4. Other Principles of Implementation

This section explores other important principles that may need to be considered to implement MNB, that were highlighted through the stakeholder engagement process that did not naturally fit with the previous assessment framework. These other principles are explored further below.

6.4.1. Defining MNB

It is important to note that MNB is not fully defined at this stage. It is important to acknowledge that a clear and shared definition of MNB will be fundamental to its effective application in Wales. Evidence from the literature review (Section 4) and stakeholder engagement (section 5) indicates that, without a clearly articulated purpose, there is a risk that MNB could be interpreted inconsistently, with potential confusion with existing mitigation or compensation requirements or applied in ways that fail to deliver meaningful ecological improvement. This was a recurring theme from the stakeholder engagement process. Stakeholders, particularly regulators and environmental NGOs, emphasised that MNB must be additional to existing requirements under environmental assessment and marine licensing regimes. This distinction is critical to maintaining regulatory integrity and stakeholder confidence, and to ensuring that MNB is not perceived as a mechanism for offsetting unavoidable harm or diluting existing protections. Clearly defining MNB could also support strategic alignment with wider marine objectives and supports development of a priority list (see Section 6.4.2 below).

6.4.2. MNB Catalogue or Framework

To support clarity and consistency in application, several stakeholders advocated for the development of a catalogue or framework of priority MNB actions. Rather than prescribing specific measures for all developments, such a catalogue could identify categories of intervention that are known or expected to deliver benefit in Welsh waters. These may include, for example, pressure reduction measures, habitat restoration and enhancement, species recovery actions, evidence generation, monitoring and innovation, or contributions to strategic nature recovery initiatives. However, some stakeholders cautioned that any catalogue should be treated as a guiding tool rather than a checklist, retaining flexibility for project alone (on-site) or sector-specific solutions. Most stakeholders indicated willingness to participate in work to identify a strategic priority list.

6.4.3. Measures Beyond Restoration

It is evident from the stakeholder engagement process that MNB should extend beyond habitat creation to include pressure reduction measures that address the underlying drivers of ecological decline. In many marine contexts, particularly offshore or in highly dynamic systems, reducing pressures such as physical disturbance, noise, or cumulative impacts may deliver more meaningful long-term benefits than attempting direct habitat enhancement. Stakeholders also highlighted the importance of enabling adaptive and innovative interventions, including actions that may not deliver immediate or guarantee successful outcomes. Allowing well-designed interventions to “fail” in a controlled and transparent way was seen as essential to building the evidence base for effective marine recovery. Regulators also noted that there are valuable learnings from failures, and that data and evidence improvements could also be seen as a measurable benefit although the intricacies of how this would work are not yet known. Such flexibility was generally viewed as most appropriate within strategic delivery mechanisms, supported by proportionate monitoring and clear governance, and reflects the SMNR principles of adaptive management and learning-by-doing.

A small number of stakeholders also raised the importance of recognising interactions with the wider marine environment beyond biodiversity alone, including the historic environment and cultural heritage assets such as submerged archaeology and historic landscapes. While this was not a prominent theme across engagement, it was noted that restoration or enhancement activities should avoid unintended impacts on heritage features and, where possible, seek opportunities for complementary outcomes. Similarly, isolated comments referenced the potential

to consider broader ecosystem services or social value measures alongside ecological restoration. These perspectives were not widely expressed but highlight the importance of ensuring that any future MNB framework remains sensitive to other considerations within marine planning and licensing processes (this is explored further in Section 6.4.9).

6.4.4. Sector-Specific Approach

Marine sectors vary considerably in how they interact with the marine environment, including differences in spatial footprint, duration of activity, nature of environmental impact, regulatory regime, and capacity to achieve positive ecological outcomes. As a result, some stakeholders viewed the application of a uniform set of MNB expectations across all sectors with caution. Proportionality was widely identified as a core design principle, with requirements scaled according to the nature, scale, and environmental risk of different activities. This perspective aligns with existing marine planning and licensing practice in Wales, which already adopts a risk-based and proportionate approach to decision-making under the WNMP (see Section 4.2.2). Activities are assessed according to their scale and potential environmental risk, allowing higher-risk or longer-term developments to be subject to more detailed assessment and monitoring, while lower-risk or short-duration activities are managed through lighter-touch processes. Stakeholders recognised this as a logical and familiar foundation for scaling any future MNB expectations. Building on the WNMP's existing banding approach, MNB requirements could be tiered according to factors such as spatial extent, duration, intensity of interaction with the seabed or water column, and potential cumulative effects, enabling proportionate expectations without introducing additional regulatory complexity.

Stakeholders (particularly developers and regulators) noted that large-scale developments, such as offshore renewable energy, ports, and marine aggregates, operate under very different constraints and opportunities compared to smaller operators or more diffuse activities. Some developers and operators highlighted that while major projects may be well placed to support strategic MNB delivery, smaller-scale sectors or activities with narrow operating margins could face disproportionate challenges if requirements are not carefully aligned. NGOs similarly emphasised that proportionality should not mean reduced ambition but rather ensure that expectations are appropriate and achievable. Applying identical requirements across sectors potentially risks imposing excessive burdens on some activities or failing to secure meaningful contributions from others.

Diffuse and mobile activities, such as fisheries (discussed in Section 4.6.3.4), were identified as presenting particular challenges for attribution, monitoring, and enforcement, making the application of project-style MNB requirements difficult in practice. This reflects the position taken in England, where Defra has clarified that fisheries are not proposed to be within the scope of MNG (Defra, 2023b). Stakeholder engagement for this study nevertheless highlighted potential alternative or complementary pathways for these sectors, including incentivised participation, voluntary contributions to strategic initiatives, or closer alignment with existing fisheries and aquaculture management objectives, rather than direct MNB obligations.

Overall, the evidence indicates that a proportionate, risk-based approach (potentially supported by banding or tiering mechanisms) would enhance the practicality, acceptability, and effectiveness of MNB in Wales. Such an approach would allow expectations to be tailored to different types of activity while maintaining a consistent overarching ambition for marine recovery and ensuring that all sectors contribute in ways that are appropriate to their interaction with the marine environment.

6.4.5. Funding Mechanisms

Funding mechanisms will be a critical enabler of MNB delivery, particularly in relation to strategic approaches. Stakeholders broadly agreed that, in many marine contexts (particularly offshore), the most effective way to deliver meaningful MNB is through pooled or collective funding, enabling interventions to be delivered at appropriate spatial scales and over longer timescales than would typically be feasible for individual projects.

The majority of stakeholders identified Marine Fund Cymru as a potentially suitable delivery mechanism for MNB contributions, particularly given its existing focus on marine restoration. Supporters highlighted the advantages of building on an established mechanism, including existing governance structures, delivery partnerships, and familiarity among stakeholders. From this perspective, aligning MNB contributions with Marine Fund Cymru could reduce duplication and accelerate implementation. However, there were reservations about relying on Marine Fund Cymru as the primary or sole delivery vehicle for MNB. Concerns included the risk of overextending the Fund beyond its original purpose, potential limitations in its ability to accommodate sector-specific contributions, and the need to ensure that MNB funding remains clearly additional to existing funding streams. If Marine Fund Cymru were to play a central role in MNB delivery, its remit, objectives, and governance arrangements would need to be clearly defined and potentially adapted to reflect the distinct aims of MNB.

The importance of transparency and accountability in the use of any MNB-related funds were identified as critical. Stakeholders highlighted that confidence in funding mechanisms would depend on clear, proportionate reporting of how contributions are allocated, what outcomes are being delivered, and how success is measured over time. This could include regular public reporting, clear links between funded actions and strategic priorities, and mechanisms to demonstrate that funded interventions are delivering genuine ecological benefit. An example of this could be through providing an annual report to the Senedd Committee which would be publicly available.

Stakeholders also discussed the appropriate use of MNB funding to support administration, coordination, and management capacity. While some stakeholders (primarily industry) expressed concern that funds could be diverted away from on-the-ground delivery, there was broad recognition (including developers, SNCBs and NGOs) that effective MNB implementation would require dedicated staff time for programme management, stakeholder coordination, monitoring, and adaptive management. Many stakeholders were content with a proportion of funds being used to support these functions, provided that this was transparent, proportionate, and clearly linked to enabling effective delivery and long-term outcomes.

Overall, the evidence suggests that strategic funding mechanisms are likely to play a central role in MNB delivery in Wales, but that no single mechanism will suit all contexts. Flexibility to use different delivery routes, clarity over the role of Marine Fund Cymru, and robust governance and reporting arrangements will be essential to maintain confidence and ensure that funding supports meaningful, additional MNB outcomes.

6.4.6. Inshore vs Offshore

The distinction between inshore and offshore marine environments emerged as a fundamental consideration in the design and application of MNB in Wales. Stakeholders consistently emphasised that ecological characteristics, data availability, governance arrangements, and practical delivery opportunities differ markedly across these spatial contexts, and that any MNB approach would need to reflect these differences to remain effective and proportionate.

In inshore waters, stakeholders identified a greater range of potential opportunities for MNB delivery. These areas are typically better understood ecologically, generally subject to increased management (e.g. MPAs) and more closely connected to existing restoration initiatives, community-led projects, and place-based management approaches. Inshore environments also tend to offer greater scope for tangible interventions, such as habitat restoration. As a result, stakeholders generally viewed inshore areas as more amenable to a mix of project alone (on-site) and strategic MNB delivery, supported by clearer links between activities, impacts, and benefits. By contrast, offshore environments were widely regarded as presenting more significant challenges for MNB implementation. Stakeholders highlighted limited baseline data, high natural variability, logistical constraints, and difficulties in attributing ecological change to individual activities as key barriers to project alone delivery offshore. Consequently, stakeholders consistently favoured strategic approaches to MNB delivery offshore, enabling contributions to be directed towards large-scale, priority interventions that address cumulative pressures rather than attempting to deliver project alone enhancements.

The inshore–offshore distinction was also reflected in views on proportionality and feasibility. Stakeholders cautioned that applying identical expectations across both zones risks either constraining offshore development with unrealistic requirements or underutilising opportunities for enhancement in inshore areas. Instead, many advocated for a spatially differentiated approach, where expectations for MNB contribution are shaped by the nature of the marine environment, the type of activity, and the scale at which ecological benefit can realistically be achieved. Importantly, stakeholders emphasised that MNB should not default to inshore delivery simply because it is easier. While some flexibility is necessary, particularly where offshore restoration opportunities are limited, there was strong support for ensuring that offshore contributions are, wherever possible, directed towards offshore or system-wide benefits, maintaining ecological relevance and credibility. This reinforces the importance of developing a MNB catalogue or framework (as noted in Section 6.4.2) and to determining how and where MNB interventions are targeted and prioritised.

Overall, the evidence indicates that effective MNB implementation in Wales will require a spatially sensitive framework, recognising the differing opportunities and constraints of inshore and offshore environments. Tailoring expectations and delivery mechanisms to these contexts would support feasibility, enhance ecological relevance, and improve stakeholder confidence.

6.4.7. Transboundary Considerations

MNB will not operate in isolation from wider spatial, regulatory, and policy frameworks, and stakeholders emphasised the importance of considering transboundary and cross-policy interactions in any future approach. Many marine activities extend across administrative boundaries, interact with UK-wide or international regimes, or span the interface between marine and terrestrial planning systems.

Several sectors operating in Welsh waters (particularly offshore renewable energy and subsea cables) are inherently transboundary, with projects and activities frequently crossing national or administrative boundaries within the UK and beyond. It may be that a future MNB approach is compatible with, and complementary to, emerging approaches in neighbouring administrations, such as England's MNG work, while remaining tailored to Welsh policy priorities. However, the intricacies of how this might work was consistently highlighted as being challenging, potential solutions were mentioned such as assigning primary responsibility based on where the majority of a development is located, alongside clear coordination between administrations to manage cross-border impacts and avoid duplication of requirements.

The interface between marine and terrestrial planning is also something that needs consideration, particularly in relation to the intertidal zone and coastal development. Stakeholders noted that terrestrial NBB already applies up to the mean low water mark, raising questions about how MNB would operate alongside, or beyond, this boundary. Clear delineation of scope and responsibility was seen as essential to avoid duplication, gaps, or unintended double-counting of benefits. Several stakeholders emphasised the importance of a joined-up approach that recognises the ecological continuity between terrestrial, intertidal and subtidal systems, while respecting the distinct regulatory frameworks that apply. Other stakeholders noted that transboundary considerations extend beyond jurisdictional boundaries to include functional ecological connectivity, such as sediment transport, species movement, and shared pressures across regional seas. From this perspective, strategic MNB delivery mechanisms were seen as particularly valuable, as they allow interventions to be targeted at ecologically meaningful scales rather than being constrained by project only boundaries.

Offshore wind development provides a clear example of activity with both transboundary and cross-policy implications. For example, projects emerging from the Round 5 Offshore Wind Leasing process may straddle the English and Welsh territorial waters. This type of project can generate impacts across multiple spatial and policy domains, including offshore and inshore marine areas as well as terrestrial environments through export cable landfalls and subsequent grid connections. As a result, a single project could potentially engage with NBB and MNB considerations in Wales, while also intersecting with England's BNG requirements and any potential future MNG

framework. Therefore, it is important to consider not only transboundary coordination, but also policy alignment when developing approaches to MNB.

Overall, the evidence indicates that effective implementation of MNB in Wales will require careful consideration of transboundary and cross-policy interactions. A clear articulation of scope, strong coordination with neighbouring administrations and terrestrial planning systems, and alignment with wider marine recovery objectives will be essential to ensure that MNB enhances, rather than complicates, the existing policy and regulatory landscape.

6.4.8. Monitoring

Effective monitoring was consistently identified as important aspects of implementing MNB, both to demonstrate that interventions are delivering meaningful ecological outcomes and to maintain confidence among regulators, developers, and wider stakeholders. Participants emphasised that monitoring should be proportionate, outcome-focused, and clearly linked to the objectives of MNB, rather than driven by onerous data collection requirements. In the marine context, where ecological change can occur over long timescales and variability is high, stakeholders cautioned against monitoring frameworks that prioritise short-term or easily measurable indicators at the expense of functional recovery, resilience, or pressure reduction. Stakeholders broadly supported an approach to monitoring that builds on existing programmes and evidence sources wherever possible, including condition assessments for MPAs, strategic monitoring linked to strategic restoration initiatives, and data collected through marine licensing and sectoral monitoring requirements. Strategic or pooled delivery mechanisms (as discussed in Section 6.4.5) were viewed as offering particular advantages for monitoring, as they enable coordinated data collection, consistency in methods, and long-term stewardship beyond individual project timescales. Importantly, monitoring was widely framed as being valuable as a learning and adaptive management tool and not just as a compliance mechanism.

With regards to responsibility of monitoring, NRW and/or Welsh Government were viewed by stakeholders as being suitable to provide an oversight and assurance role, focused on setting expectations, reviewing outcomes, and ensuring accountability, particularly if and when MNB is delivered through strategic mechanisms. Primary responsibility for designing and implementing monitoring programmes was also seen as most appropriately sitting with the delivery body, drawing on specialist ecological expertise and operating to agreed objectives and standards. The role of developers or other groups required to deliver MNB would typically contribute through funding, provision of relevant project data, provision of specialist advice, or compliance with agreed reporting requirements, rather than undertaking bespoke monitoring themselves.

6.4.9. Other Stakeholder Considerations

The effective delivery of MNB will depend on continued engagement and coordination with the wide range of sectors operating within Welsh and neighbouring waters, recognising that environmental enhancement must be planned alongside safety, heritage, infrastructure, and operational considerations. The marine environment is a shared and often constrained space, where multiple uses overlap spatially and temporally. As such, interventions such as habitat creation and restoration may not always be appropriate in areas used for navigation and shipping routes, port and harbour operations, anchorage and dredging areas, subsea cables and pipelines, defence activities, or sites of archaeological and historic importance. Enhancement measures will therefore need to be carefully sited and designed to avoid conflicts with these established uses and statutory responsibilities.

The stakeholder engagement for this study highlighted the importance of early and ongoing dialogue with relevant authorities, regulators, and asset owners to identify constraints at the outset and to ensure that MNB opportunities are both ecologically meaningful and practically deliverable. Integrating MNB considerations into pre-application discussions, marine licensing, and planning processes would enable potential enhancement, sensitivities, and operational requirements to be assessed together. Collaboration can help identify co-benefits, for example incorporating NID into port or coastal infrastructure upgrades or targeting enhancement in areas where existing management or monitoring frameworks are already in place. This form of cross-sector working aligns closely with the principles of SMNR and the WNMP, particularly those relating to integration, collaboration, and decision-making

at an appropriate spatial scale. Continued engagement should therefore be viewed as a core component of implementation, helping to ensure that MNB delivery is feasible, locally appropriate, and compatible with the broader use and management of Welsh seas.

7. Summary

This MNB Scoping Study has examined whether, and how, a net benefit approach could be applied to the marine environment in Wales. Drawing on an extensive literature and policy review, alongside a structured programme of stakeholder engagement, the study has explored the opportunities, risks, and practical considerations associated with introducing MNB within the Welsh marine planning and licensing framework.

The review of international, UK, and devolved government approaches demonstrates that while statutory net benefit requirements remain limited, there is a growing shift towards embedding net positive outcomes within marine policy and practice. Drawing on this, alongside stakeholder feedback, it is apparent that there is no single, universally applicable model for delivering MNB. Different approaches offer distinct advantages and constraints depending on context, sector, and scale, and the analysis highlights clear trade-offs between ambition, deliverability, and regulatory certainty.

Wales is supported by a well-established and enabling policy and legislative framework within which MNB could be considered. Key legislation, including the Environment (Wales) Act 2016 and the Well-being of Future Generations (Wales) Act 2015, together with the principles of SMNR, already promote long-term resilience, prevention, integration, and adaptive management (see Section 2.3). The WNMP also provides a coherent spatial and policy framework for marine decision-making, incorporating risk-based approaches to licensing and sectoral development, and could offer a practical mechanism through which any future MNB considerations might be integrated (see Section 4.2.2).

Evidence from stakeholder engagement indicates that fully metric-based systems face significant challenges in marine contexts, particularly offshore, due to ecological complexity, data limitations, and long recovery timescales. Qualitative or hybrid approaches, grounded in ecosystem resilience, pressure reduction, and strategic schemes, were consistently viewed as more appropriate for Welsh waters, provided they are supported by clear guidance, governance, and monitoring arrangements. Stakeholders broadly agreed that voluntary approaches alone are unlikely to deliver MNB at the scale required, and that mandatory participation, in principle, is necessary to ensure consistency and fairness, while retaining flexibility in delivery. Sector-specific and spatially differentiated approaches were identified as potential mechanisms to ensure proportionality and feasibility across diverse marine activities. Strategic application of MNB was unanimously supported and pooled funding mechanisms were widely agreed as a means of enabling delivery at ecologically meaningful scales, whilst it was considered that there was still a space for project alone (on-site) delivery of MNB.

The scoping study highlights that this is a complex topic area, with many intricacies that will require careful and considered implementation. If MNB is taken forward in Wales, for which the majority of stakeholders engaged were supportive of, the evidence suggests that careful consideration would be needed around the form it might take, the mechanisms through which it could be delivered, and how it would interact with existing marine planning and licensing processes. The analysis indicates that approaches which are flexible, proportionate, and capable of evolving over time may be better suited to the complexity of marine systems than highly prescriptive models.

8. References

Auckland Council (2016). Auckland Unitary Plan (Operative in Part). Auckland: Auckland Council. Available at: https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/unitary-plan/Pages/default.aspx [Accessed October 2025]

BIOFIN (2023). Habitat banking in Colombia: Preserving biodiversity and creating economic opportunities. 11 May. Available at: https://www.biofin.org/knowledge-product/policy-brief-habitat-banking-colombia-preserving-biodiversity-and-creating [Accessed October 2025]

British Ecological Society (2023). Wales Policy Group, Caffi Ecology: Net Benefits for Biodiversity Report. Available at: https://www.britishecologicalsociety.org/wp-content/uploads/2023/03/2023_WPG_Caffi-Ecology_Report.pdf [Accessed October 2025]

Chartered Institute of Ecology and Environmental Management (CIEEM) (2022). Welsh Government's approach to net benefits for biodiversity and the DECCA framework in the terrestrial planning system: briefing paper. Winchester: CIEEM. Available at: https://cieem.net/wp-content/uploads/2022/08/Net-Benefits-briefing.pdf [Accessed December 2025].

Convention on Biological Diversity (CBD) (2022). Kunming-Montreal Global Biodiversity Framework. Available at: https://www.cbd.int/gbf [Accessed December 2025]

Darbi, M. and Wende, W. German impact mitigation regulation – an example towards no net loss of biodiversity? ICCB-ECCB 2015, Symposium 124 "Biodiversity management and development: challenges, opportunities and new directions". 4 August, 2015, Le Corum, Montpellier.

Department of Agriculture, Environment and Rural Affairs (DAERA) (2017). NI Biodiversity Checklist. Belfast: DAERA. Available at: https://www.northernireland.gov.uk/publications/ni-biodiversity-checklist-documents [Accessed December 2025]

Department of Agriculture, Environment and Rural Affairs (DAERA) (2018). Draft Marine Plan for Northern Ireland. Belfast: DAERA. Available at: https://www.daera-ni.gov.uk/articles/marine-plan-northern-ireland [Accessed December 2025]

Department of Agriculture, Environment and Rural Affairs (DEARA) (2023). Biodiversity Strategy 2023–2030. Available at: https://www.daera-ni.gov.uk/topics/biodiversity [Accessed December 2025].

Department of Agriculture, Environment and Rural Affairs (DAERA) (2024a). Environmental Improvement Plan for Northern Ireland. Belfast: DAERA. Available at: https://www.daera-ni.gov.uk/publications/environmental-improvement-plan-northern-ireland [Accessed December 2025]

Department of Agriculture, Environment and Rural Affairs (DAERA) (2024b). Northern Ireland Marine Protected Areas (MPAs) Strategy Review 2024–2030. Belfast: DAERA. Available at: https://www.daera-ni.gov.uk/consultations/consultation-northern-ireland-marine-protected-areas-mpas-strategy-review [Accessed December 2025]

Department of Agriculture, Environment and Rural Affairs (DAERA) (2025). Northern Ireland Blue Carbon Action Plan 2025–2030. Belfast: DAERA. Available at: https://www.daera-ni.gov.uk/publications/northern-ireland-blue-carbon-action-plan-2025-2030 [Accessed December 2025]

Department of Climate, Energy and the Environment (Ireland) (2023). National Marine Planning Framework. Dublin: Department of Climate, Energy and the Environment. Available at: https://www.gov.ie/en/department-of-climate-energy-and-the-environment/publications/national-marine-planning-framework-2/ [Accessed December 2025]

Department of Climate, Energy and the Environment (Ireland) (2025). National Designated Maritime Area Plan (DMAP) for Offshore Renewable Energy. Dublin: Department of Climate, Energy and the Environment. Available at: https://www.gov.ie/en/department-of-climate-energy-and-the-environment/publications/national-designated-maritime-area-plan-dmap-for-offshore-renewable-energy/ [Accessed December 2025]

Department for Environment, Food & Rural Affairs (Defra) (2018). 25 Year Environment Plan. Available at: https://www.gov.uk/government/publications/25-year-environment-plan [Accessed December 2025].

Department for Environment, Food and Rural Affairs (Defra) (2019). Marine strategy part one: UK updated assessment and Good Environmental Status. Available at: https://www.gov.uk/government/publications/marine-strategy-part-one-uk-updated-assessment-and-good-environmental-status [Accessed December 2025].

Department for Environment, Food & Rural Affairs (Defra) (2023a). Statutory biodiversity metric tools and guides. London: Defra. Available at: https://www.gov.uk/government/publications/statutory-biodiversity-metric-tools-and-guides [Accessed December 2025].

Department for Environment, Food & Rural Affairs (Defra) (2023b). Consultation on the principles of marine net gain. Available at: https://www.gov.uk/government/consultations/consultation-on-the-principles-of-marine-net-gain [Accessed December 2025].

Department for Environment, Food & Rural Affairs (Defra) and Marine Management Organisation (MMO) (2024). Explore marine plans. Available at: https://www.gov.uk/guidance/explore-marine-plans [Accessed December 2025].

Department for Environment, Food and Rural Affairs (Defra) (2025). Biodiversity net gain for nationally significant infrastructure projects. Available at: https://www.gov.uk/government/consultations/biodiversity-net-gain-for-nationally-significant-infrastructure-projects [Accessed December 2025].

Department of Fisheries and Oceans Canada (DFO) (2019). Policy for Applying Measures to Offset Harmful Impacts to Fish and Fish Habitat Under the Fisheries Act. Ottawa: DFO. Available at: https://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/policies-politiques-eng.html [Accessed December 2025].

Department of Fisheries and Oceans Canada (DFO) (2019). Policy for Applying Measures to Offset Harmful Impacts to Fish and Fish Habitat Under the Fisheries Act. Ottawa: DFO. Available at: https://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/policies-politiques-eng.html [Accessed December 2025].

Department of Fisheries and Oceans Canada (DFO) (2025). Ecosystem Approach to Fisheries Management Science Methods Toolbox. Available at: https://open.canada.ca/data/en/dataset/5c039538-7605-41f1-a9ba-c3cf82200334 [Accessed December 2025].

Environment (Wales) Act (2016). Available at: https://www.legislation.gov.uk/anaw/2016/3/contents/enacted [Accessed December 2025].

Environment Act (2021) (c.30). London: The Stationery Office. Available at: https://www.legislation.gov.uk/ukpga/2021/30/contents [Accessed December 2025].

Environmental Protection Agency (EPA) United States (1972). Clean Water Act. Washington, D.C.: EPA. Available at: https://www.epa.gov/laws-regulations/summary-clean-water-act [Accessed December 2025].

Fisheries Act 2020 (2020) Fisheries Act 2020. UK: Parliament. Available at: https://www.legislation.gov.uk/ukpga/2020/22/contents [Accessed December 2025].

HM Government, Northern Ireland Executive, Scottish Government and Welsh Government (2011). UK Marine Policy Statement. London: The Stationery Office. Available at: https://www.gov.uk/government/publications/uk-marine-policy-statement [Accessed December 2025].

HM Government (2018). A Green Future: Our 25 Year Plan to Improve the Environment. London: Department for Environment, Food & Rural Affairs (Defra). Available at: https://www.gov.uk/government/publications/25-year-environment-plan [Accessed December 2025].

HM Government (2023). Environmental Improvement Plan 2023. London: Department for Environment, Food & Rural Affairs (Defra). Available at: https://www.gov.uk/government/publications/environmental-improvement-plan [Accessed December 2025].

Marine Act (Northern Ireland) (2013). c.10. Available at: https://www.legislation.gov.uk/nia/2013/10/contents [Accessed December 2025].

Marine and Coastal Access Act (2009). c.23. London: The Stationery Office. Available at: https://www.legislation.gov.uk/ukpga/2009/23/contents [Accessed December 2025].

Marine (Scotland) Act (2010). asp 5. Available at: https://www.legislation.gov.uk/asp/2010/5/contents [Accessed December 2025).

Marine Strategy Regulations (2010). SI 2010/1275. Available at: https://www.legislation.gov.uk/uksi/2010/1275/contents [Accessed December 2025].

Marine Management Organisation (MMO) (2025). The East Marine Plan: Pioneering a new approach and publication of the Sustainability Appraisal Scoping report. Available at: https://marinedevelopments.blog.gov.uk/2025/04/09/the-east-marine-plan-pioneering-a-new-approach-and-publication-of-the-sustainability-appraisal-scoping-report/ [Accessed October 2025]

Natural England (2024). Biodiversity Gain Site Register. Available at: https://environment.data.gov.uk/dataset/6c0d712b-4716-4da9-923c-8d7cb127bff5 [Accessed December 2025].

Natural England (2026). Marine Net Gain Assessment Framework. NECR689. Report prepared by Howell Marine Consulting and Environmental Resources Management for Defra. Available at: https://publications.naturalengland.org.uk/publication/5257266440437760 [Accessed February 2026].

NatureScot (2021). Scottish Marine Environmental Fund (SMEEF). Available at: https://www.nature.scot/SMEEF [Accessed September 2025]

NatureScot (2023). Developing with Nature guidance. Inverness: NatureScot. Available at: https://www.nature.scot/doc/developing-nature-guidance [Accessed December 2025].

NatureScot (2024). A Biodiversity Metric for Scotland's Planning System Available at: https://www.nature.scot/doc/biodiversity-metric-scotlands-planning-system-key-issues-consultation [Accessed September 2025]

National Environment Management Authority (NEMA) (2022). Uganda National Guidelines for Biodiversity and Social Offsets. Kampala: NEMA. Available at: https://www.nema.go.ug/en/national-guidelines-for-biodiversity-and-social-offsets/ [Accessed September 2025]

National Environment Management Authority (NEMA) (2024). Uganda National Biodiversity Strategy and Action Plan III (2025–2030). Kampala: NEMA. Available at: https://www.nema.go.ug/en/national-biodiversity-strategy-and-action-plan-iii-2025-2030/ [Accessed September 2025]

Nature Repair Act (2023). Commonwealth of Australia. Available at: https://www.legislation.gov.au/C2023A00121 [Accessed September 2025]

New South Wales Government (2025). Biodiversity Offsets Scheme. Available at: https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme [Accessed September 2025]

Office for Environmental Protection (2024). OEP report on the drivers and pressures affecting nature in Northern Ireland. Available at: https://www.theoep.org.uk/report/drivers-and-pressures-northern-ireland [Accessed October 2025]

OSPAR Commission (1992). Convention for the Protection of the Marine Environment of the North-East Atlantic. Available at: https://www.ospar.org/convention [Accessed December 2025].

OSPAR Commission (2021). North-East Atlantic Environment Strategy 2030. Available at: https://www.ospar.org/convention/strategy [Accessed December 2025].

Petroleum Act (1998). Petroleum Act 1998. UK: Parliament. Available at: https://www.legislation.gov.uk/ukpga/1998/17/contents [Accessed December 2025].

Planning and Infrastructure Bill (2024–26). UK Parliament. Available at: https://bills.parliament.uk/bills/3946 [Accessed December 2025].

Pouvreau, S., Cochet, H., Fabien, A., Arzul, I., Lapegue, S., Gachelin, S., Salaun, B. (2021). Inventory, ecological diagnosis and restoration of the main flat oyster beds in Brittany: the FOREVER project. Available at: https://doi.org/10.13155/79506 [Accessed October 2025]

Republic of Uganda (2019). National Environment Act 2019. Kampala: Government of Uganda. Available at: https://nema.go.ug/sites/all/themes/nema/docs/NationalEnvironmentAct [Accessed October 2025]

Scottish Government (2015). Scotland's National Marine Plan. Edinburgh: Scottish Government. ISBN 9781785442148. Available at: https://www.gov.scot/publications/scotlands-national-marine-plan/ [Accessed December 2025].

Scottish Government (2022). A Blue Economy Vision for Scotland. Edinburgh: Scottish Government. ISBN 9781804358856. Available at: https://www.gov.scot/publications/blue-economy-vision-scotland/ [Accessed December 2025].

Scottish Government (2023). National Planning Framework 4. Available at: https://www.gov.scot/publications/national-planning-framework-4/ [Accessed December 2025].

Scottish Government (2024a). Scottish Biodiversity Strategy to 2045: Tackling the Nature Emergency in Scotland. Edinburgh: Scottish Government. ISBN 9781836011507. Available at: https://www.gov.scot/publications/scottish-biodiversity-strategy-2045/ [Accessed December 2025].

Scottish Government (2024b). Scottish Biodiversity Delivery Plan 2024–2030. Edinburgh: Scottish Government. ISBN 9781836011507. Available at: https://www.gov.scot/publications/scottish-biodiversity-delivery-plan-20242030/ [Accessed December 2025].

Scottish Marine Environmental Enhancement Fund (SMEEF) (2025). Available at: https://smeef.scot/ [Accessed December 2025].

Scottish Parliament (2025). Natural Environment (Scotland) Bill. Edinburgh: Scottish Parliament. Available at: https://www.parliament.scot/bills-and-laws/bills/s6/natural-environment-scotland-bill [Accessed December 2025].

Simpson, M. (2023). Biodiversity in planning in post-Brexit Northern Ireland: The potential contribution of planning to biodiversity conservation and enhancement. Ulster University. Available at: https://pure.ulster.ac.uk/en/publications/biodiversity-in-planning-in-post-brexit-northern-ireland-the-pote [Accessed October 2025]

Spanish Government (2023). Ministry for the Ecological Transition and the Demographic Challenge. Planes de Ordenación del Espacio Marítimo de España (Maritime Spatial Plan). Available at:

https://www.miteco.gob.es/es/costas/temas/proteccion-medio-marino/ordenacion-del-espacio-maritimo.html [Accessed October 2025]

Stuart, A., Bond, A. and Franco, A.M.A. (2025). Public opinions of a net outcome policy: The case of biodiversity net gain in England, Journal of Environmental Management, 394, p. 127421.

The Environmental Targets (Marine Protected Areas) Regulations (2023). (SI 2023/94) London: The Stationery Office. Available at: https://www.legislation.gov.uk/uksi/2023/94/contents/made [Accessed December 2025].

The Guardian (2025). Labour housing plans could destroy 215,000 hectares of nature in England, analysis shows. July 2025. Available at: https://www.theguardian.com/environment/2025/jul/10/building-regulations-nature-biodiversity-analysis-england [Accessed October 2025]

Town and Country Planning Act (1990). (c.8). London: The Stationery Office. Available at: https://www.legislation.gov.uk/ukpga/1990/8/contents [Accessed December 2025].

United Nations (UN) (2015). Sustainable Development Goals. Available at: https://sdgs.un.org/goals [Accessed December 2025]

United Nations Framework Convention on Climate Change (UNFCCC) (2015). Available at: https://unfccc.int/ [Accessed December 2025]

United Kingdom (UK) Government (2021). Net Zero Strategy: Build Back Greener. Available at: https://www.gov.uk/government/publications/net-zero-strategy [Accessed December 2025].

United Kingdom (UK) Government (2022). British Energy Security Strategy. Available at: https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy [Accessed December 2025]

UK Government (2023). Offshore Wind Environmental Improvement Package — Energy Security Bill factsheet. London: UK Government. Available at: https://www.gov.uk/government/publications/energy-security-bill-factsheets/energy-security-bill-factsheet-offshore-wind-environmental-improvement-package [Accessed December 2025]

United Kingdom (UK) Government (2025). The Marine Recovery Funds Regulations 2025. Available at: https://www.legislation.gov.uk/uksi/2025/1230/ [Accessed December 2025]

United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) (2025). Wetland Mitigation Banking Program. Available at: https://www.nrcs.usda.gov/programs-initiatives/wetland-mitigation-banking-program [Accessed December 2025]

Victoria. Department of Natural Resources and Environment (2002). Victoria's Native Vegetation Management: A Framework for Action. East Melbourne: Department of Natural Resources and Environment. Available at: https://www.environment.vic.gov.au/__data/assets/pdf_file/0021/90363/Native_Vegetation_Management_-_A_Framework_for_Action.pdf [Accessed December 2025]

WCS Uganda (2021). Mitigating Development Impacts on Biodiversity. Available at: https://uganda.wcs.org/Initiatives/Mitigating-Development-Impacts-on-Biodiversity.aspx [Accessed October 2025]

Well-being of Future Generations (Wales) Act (2015). anaw 2. Available at: https://www.legislation.gov.uk/anaw/2015/2/contents/enacted [Accessed December 2025]

Welsh Government (2015). Nature Recovery Action Plan: Our Strategy for Nature. Cardiff: Welsh Government. Available at: https://www.gov.wales/sites/default/files/publications/2019-05/nature-recovery-action-plan-2015.pdf [Accessed December 2025].

Welsh Government (2016). Introducing Sustainable Management of Natural Resources. Available at: https://naturalresources.wales/media/678063/introducing-smnr-booklet-english-final.pdf [Accessed December 2025].

Welsh Government (2019). Welsh National Marine Plan. Cardiff: Welsh Government. Available at: https://www.gov.wales/welsh-national-marine-plan [Accessed December 2025].

Welsh Government (2021a). Net Zero Wales Carbon Budget 2 (2021–25). Cardiff: Welsh Government. Available at: https://www.gov.wales/net-zero-wales-carbon-budget-2-2021-2025 [Accessed December 2025].

Welsh Government (2021b). Future Wales: The National Plan 2040. Cardiff: Welsh Government. Available at: https://www.gov.wales/future-wales-national-plan-2040 [Accessed December 2025].

Welsh Government (2022). Biodiversity Deep Dive: Recommendations. Available at: https://www.gov.wales/biodiversity-deep-dive-recommendations [Accessed December 2025].

Welsh Government (2024). Planning Policy Wales. Available at: https://www.gov.wales/planning-policy-wales [Accessed December 2025].

Welsh Government (2025a). Marine Planning Technical Statement: Marine Ecosystem Resilience, Restoration and Enhancement (Policy ENV_01). Available at: https://www.gov.wales/sites/default/files/publications/2025-09/marine-planning-technical-statement-resilient-marine-ecosystems-env01.pdf [Accessed December 2025].

Welsh Government (2025b). Offshore Wind Task and Finish Group Action Plan: 2025 to 2026. Cardiff: Welsh Government. Available at: https://www.gov.wales/offshore-wind-task-and-finish-group-action-plan-2025-2026 [Accessed December 2025].

Wildlife and Natural Environment Act (Northern Ireland) (2011). c.15. (Northern Ireland). Available at: https://www.legislation.gov.uk/nia/2011/15/contents [Accessed December 2025].

Witteveen and Bos (2020). Nature-Inclusive Design: A Catalogue for Offshore Wind Infrastructure.

WSP (2024). First large scale transplantation of eelgrass in Denmark. Available at: https://stateofgreen.com/en/solutions/first-large-scale-transplantation-of-eelgrass/ [Accessed October 2025]