Global Ocean Accounts Partnership

Ocean Accounting for Marine Restoration Practitioners: an Introduction

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Authors

Emma Lockerbie

Emma Calhoun

Maria Alarcon Blazquez

Jordan Gacutan

Philip A.S. James

The UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) is a global Centre of excellence on biodiversity. The Centre operates as a collaboration between the UN Environment Programme and the UK-registered charity WCMC. Together we are confronting the global crisis facing nature.

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Executive Summary

Marine ecosystem restoration plays a critical role in enhancing resilience, safeguarding biodiversity, and supporting economic and social well-being. However, the long-term success and scalability of restoration projects often depends on the ability of restoration practitioners to demonstrate measurable outcomes, attract funding, and align projects with policy objectives. Ocean accounts offer a structured, standardised framework to systematically capture and integrate environmental, social, and economic data. This approach enables practitioners to clearly demonstrate the outcomes and successes of restoration activities to policymakers, investors and other decision-makers. Ocean accounts can add value to restoration projects in multiple ways, including:

- Supporting better-informed decision-making through the presentation of integrated data from restoration outcomes in a familiar, standardised format.
- Strengthening the case for funding and support by clearly communicating the benefits of restoration efforts to the economy and society.
- Enabling accountability and transparency through the consistent tracking and reporting of progress over time.

Ocean accounts offer a modular and flexible approach that allows restoration practitioners to select the most relevant accounts to compile, based on their project objectives. By integrating accounts of ecosystem extent, condition, and flows between the environment and the economy, restoration projects can track changes in ecosystem health and measure the benefits of restoration over time. The structured nature of ocean accounts enhances communication with funders, policymakers, and investors by presenting data in a clear format that aligns with the international standards for capturing economic and environmental data. This can give funders and investors the confidence that the data is robust, consistent and grounded in best practice. Alongside this, ocean accounts can highlight the role of ecosystems in an economic context. This allows non-scientific audiences to better understand the tangible returns on investment that restoration activities can provide. Providing this information can make it easier to secure long-term financial and institutional support. Furthermore, ocean accounts have the potential to align restoration efforts with national and global sustainability frameworks, such as the Kunming-Montreal Global Biodiversity Framework, Sustainable Development Goals, and National Adaptation Plans. This can support the contribution of restoration projects to broader environmental and economic planning.

This document explores how restoration practitioners can leverage ocean accounts to strengthen the impact of their projects. It provides an overview of ocean accounts and their key characteristics, highlighting how they can be applied throughout the restoration project lifecycle. It also examines how ocean accounts can support alignment with national and international sustainability commitments, ensuring that restoration outcomes contribute to broader policy and economic frameworks. Case studies from Indonesia and Costa Rica demonstrate how ocean accounts can improve governance, strengthen opportunities to secure funding, and support data-driven decision-making.

Photo: Bella Charlesworth

Introduction

Ecosystem restoration has the potential to transform degraded marine ecosystems into resilient systems, safeguarding long-term ecological, social, and economic benefits in a rapidly changing world. Growing recognition of the link between resilient ecosystems and economic stability (e.g. Derissen, Quaas and Baumgärtner, 2011; Fahimnia and Jabbarzadeh, 2016; Jesse, Heinrichs and Kuckshinrichs, 2019) presents a powerful opportunity to attract substantial investment into restoration projects. Restoration investment can foster collaboration across sectors and support projects in delivering lasting positive impacts.

Ocean accounts are a valuable emerging tool for restoration practitioners. They provide a structured way to capture both quantitative and qualitative data throughout marine ecosystem restoration projects. Rather than replacing existing data collection frameworks, ocean accounts complement them. These accounts offer a consistent structure for integrating information that is often gathered in a particular format to meet specific funder or project requirements. The use of a standardised, data-driven approach enables practitioners to quantify and communicate the ecological, economic, and social benefits of restoration in a clear and more widely accessible format. By presenting restoration progress in a way that resonates with a wide range of stakeholders —including governments, policymakers, and private sector entities—ocean accounts can help unlock future investment and support the scalability of restoration initiatives. Crucially, they also provide a way to communicate the evidence base needed to demonstrate success, identify areas for improvement, and support adaptive management. The multidisciplinary nature of ocean accounts enables reporting on the complex interactions between ecosystem restoration and society. These accounts also help reveal how social and economic systems depend on healthy marine environments.

Over the past five years, the Global Ocean Accounts Partnership (GOAP) has supported nations, non-governmental organisations and researchers in developing ocean accounts. To date, over 30 countries are already developing ocean accounts, working alongside GOAP and supported by regional communities of practice (Europe, Pacific, Africa, Asia-Pacific and Latin America and Caribbean). Some countries, such as Indonesia, have even built ocean accounts into their government data frameworks. As ocean accounts become more widely recognised globally, there is a significant opportunity for restoration practitioners to also make use of this tool within their projects.

Ecosystem restoration projects can play a vital role in supporting national policy objectives and international commitments. However, the link between local or regional restoration eorts and broader policy frameworks is often unclear or under-articulated. Ocean accounts help bridge this gap by translating restoration outcomes into policy-relevant metrics—such as increased coastal protection, enhanced fisheries productivity, or blue carbon sequestration. By structuring data in a way that aligns with national economic and environmental reporting systems, ocean accounts support evidence-based policymaking and enable alignment with sustainability goals. They also position ecosystems as essential national assets, strengthening the case for their inclusion in planning, budgeting, and regulatory processes. In doing so, ocean accounts can help restoration practitioners engage more eectively with policy stakeholders and demonstrate the strategic value of restoration in delivering environmental, social, and economic benefits. In this document we explore how ocean accounts could be used to support marine ecosystem restoration efforts. We aim to provide readers with:

- **A clear understanding of the different types of ocean accounts** and how they relate to marine ecosystem restoration projects.
- **Guidance on how ocean accounts can be applied across various stages of restoration projects**, including planning, implementation, and monitoring. 5
- **An explanation of how ocean accounts can help align restoration outcomes with national and international policy commitments**.

While this document does not provide a granular step-by-step guide to developing ocean accounts, support for account compilation is available through the Global Ocean Accounts Partnership (GOAP) and the GOAP Technical Guidance on Ocean Accounting for Sustainable Development (GOAP 2021)[1] .

What are ocean accounts?

Ocean accounts provide a standardized structured framework for systematically organizing and integrating environmental, social and economic data related on marine and coastal ecosystems. These accounts organize measurements of ecosystem extent, condition and services to a format that is comparable with economic data. This data compilation allows the quantification and tracking of ecosystem changes, ensuring restoration outcomes, and associated societal outcomes, are measurable and integrated into broader sustainability goals.

While the UN System of Environmental-Economic Accounting Ecosystem Accounting (SEEA EA) framework serves as the overarching statistical standard for environmental-economic accounting, its application to ocean ecosystems has required further development. This has been advanced through the Global Ocean Accounts Partnership

1 It should be noted Technical Guidance is going through a significant update and revision in 2025.

(GOAP) Technical Guidance on Ocean Accounting for Sustainable Development (2021) (hereafter referred to as "GOAP Technical Guidance", (GOAP, 2021)). This document introduces the concept of ocean accounts and explains how data on marine ecosystems can be organised within an ocean accounts framework. We draw on the GOAP Technical Guidance, which outlines how ocean accounts can align with existing statistical standards such as the System of National Accounts (SNA), the SEEA Ecosystem Accounting (SEEA EA), and national statistical systems. Within the ocean accounts framework, several types of accounts are described, each capturing different aspects of the ocean's contributions to people and the economy (Figure 1).

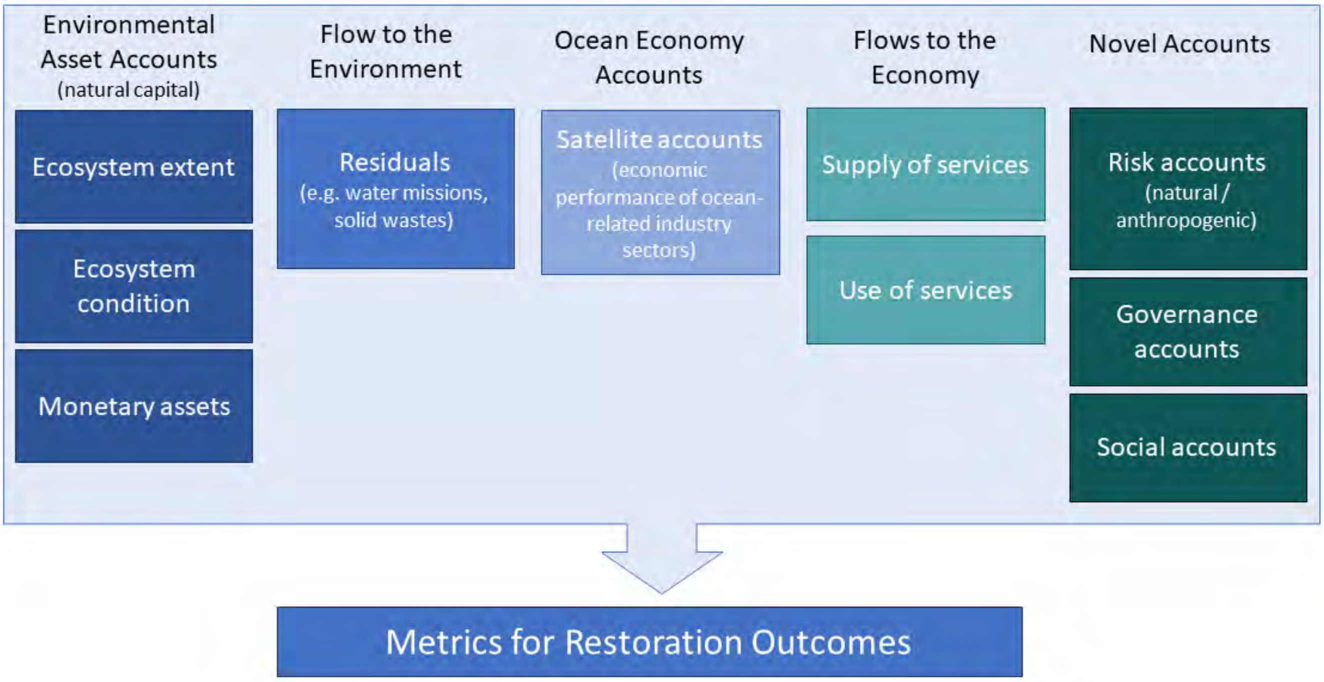

Figure 1: A simple depiction of the various accounts described under the ocean accounts framework (Lockerbie *et al.* 2025).

Due to the modular nature of the ocean accounts framework, restoration practitioners can select and compile the accounts most relevant their specific project objectives. For example, a project focused on seagrass meadow restoration may prioritize ecosystem extent and condition accounts to track habitat recovery, while a coral reef restoration initiative could incorporate biodiversity condition accounts to assess species richness and reef health. Ocean accounts don't just measure ecological change, they can also capture economic, social and governance benefits. For example, accounts tracking flows to the economy can quantify the value of coastal protection, carbon sequestration, and improved fisheries. Governance accounts, on the other hand, can track the impact of policy actions and the role of stakeholders in delivering restoration outcomes. Additionally, national economic and social accounts can highlight the vital role these ecosystems play for people by analysing coastal communities' dependence on nature.

This flexibility of the framework ensures that ocean accounts remain adaptable, scalable, and aligned with available data and policy priorities.

When developing ocean accounts, assets and flows can be measured and reported in both physical (e.g., hectares of seagrass, tonnes of fish) and monetary terms (e.g., the value of a hectare of wetland based on the services it provides, or the market price of fish).

What is an asset?

Ecosystems and environmental resources are referred to as assets, while the benefits they provide are termed flows. An **asset** holds value for society (United Nations, 2024), such as a coral reef or a mangrove forest. These assets can be captured within asset accounts (e.g. ecosystem extent and ecosystem condition accounts).

What is a flow?

A **flow** represents the benefit derived from the asset, such as fish from the reef or storm protection from the mangroves. Flows can be captured within flow or ecosystem services accounts (Figure 2).

The alignment of the ocean accounts framework with the SNA and SEEA EA ensures that marine restoration outcomes can be integrated into national economic and environmental reporting systems. Using a format consistent with these internationally agreed accounting standards can make the information held in ocean accounts more accessible to policymakers, funders, and stakeholders. The use of familiar formats and concepts, which are already well established in economic planning and decision-making can bridge the gap between environmental data and practical decisions. Ocean accounting uses structured asset, condition, and flow accounts. This format allows restoration practitioners to quantify ecosystem recovery and track economic benefits such as enhanced fisheries or carbon sequestration. Ocean accounting also supports the assessment of policy effectiveness in ways that align with existing economic and financial decision-making processes. By aligning with existing economic systems, ocean accounts can help bridge the historical gap between biodiversity and economic systems. As a result, natural capital considerations are more eectively embedded in marine and coastal management decisions.

Ocean accounts can therefore allow practitioners to better demonstrate the economic and societal benefits of restoration, furthering efforts to secure funding, influence policy, and align projects with national and international sustainability goals. In doing so, ocean accounts can strengthen the business case for investment, facilitating integration with national environmental-economic reporting. Alongside this, ocean accounts can support alignment of restoration with international policy frameworks such as the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs),the United Nations Framework Convention on Climate Change and the Paris Agreement. Ecosystem accounting has already been used to improve and implement restoration outcomes through the SEEA EA framework (Gaglio *et al.* 2024; King *et al.* 2024). For example, Gaglio et al. (2024) compiled extent and condition accounts for a coastal brackish lagoon in Northern Italy. Using ecosystem accounting principles, Gaglio et al. (2024) were able to quantify changes in ecosystem services and condition, providing a comprehensive evaluation of the impacts of restoration. This study found that the development of ecosystem-level accounts is imperative for scaling up restoration levels at the national sub-national scales. Similarly, a case studies in the EU and Liberia found that ecosystem services accounts detailing the contributions from forest ecosystems could lead to improved policy for the restoration of natural forests (King *et al.*, 2024). As indicated in these examples, the principles and guidelines of the SEEA EA are designed to be applied at varying scales, from ecosystem-level to national and regional.

Key characteristics of ocean accounts

Ocean accounts offer several key characteristics listed below that make them particularly suited to support ecosystem restoration efforts. By organising data into standardised formats, ocean accounts support the full value chain—from data collection to the generation of information, knowledge, and actionable insights—helping practitioners move from monitoring to decision-making with greater confidence. Under the ocean accounting framework, the key characteristics of accounts are:

A. **Holistic** - Accounts are not limited to one data type. They encompass multiple domains of data, including economic, environmental and social. This multidisciplinary approach ensures that restoration efforts are evaluated not only in ecological terms but also in their economic and societal contributions, making them more impactful for funding and policy decisions.
B. **Standardised** – The accounting format allows different types of data to be integrated into the same framework, enabling side-by-side comparison and analysis. Ocean accounts follow internationally recognized frameworks, including SEEA EA and the SNA, ensuring consistency, comparability, and compatibility with national and global environmental-economic reporting systems.
C. **Modular** – Not all account types and domains need to be developed for information to be useful. Developing even a single relevant account type can still

provide valuable insights. Individual accounts can be compiled, and added to, as necessary as the need evolves.

D. **Accessible –** Ocean accounts bridge multiple disciplines, allowing them to be accessible to ecologists (for tracking ecosystem health), economist (for valuing restoration benefits), policymakers (for integrating restoration into national planning) and investors (for assessing financial returns on restoration initiatives). The structured reporting format ensures that ocean accounts translate complex ecological data into decision-ready insights.
E. **Flexible -** Ocean accounts are adaptable to the specific goals and contexts of individual projects, allowing practitioners to select the most relevant account types and variables. At the same time, they follow internationally recognised structures and classifications, enabling consistency, comparability, and aggregation of results across regions or scales.

Ocean account types and their relevance to restoration

Asset Accounts

Ecosystem extent

A common starting point for ecosystem accounting is organising information on the extent of different ecosystem types, and how that extent changes over time. This is also a logical starting point for account development in ecosystem restoration. Ecosystem extent accounts divide ecosystems into spatial units to organise and monitor data (United Nations, 2024). While boundaries for marine ecosystems may be unclear, ecosystems can be defined by the internationally recognised typologies – such as the IUCN Global Ecosystem Typology - or broad habitat types such as mangroves or seagrass. Many countries also have their own national ecosystem typologies, which can be applied as long as they are clearly defined and consistently used. Ensuring alignment or interoperability between typologies is important to allow ecosystem accounts to be compared and integrated across regions or scales.

Extent accounts include the opening and closing area (stock) of a defined ecosystem, as well as the additions and reductions in the area over the given time period. They are presented in a 'balance sheet' format. Table 1 provides a simplified version of an ocean ecosystem extent account for multiple marine ecosystems. In marine restoration projects, the opening stock represents the baseline data available for the site. This may be based on current or historical ecosystem extent. Changes to ecosystem extent can then be regularly recorded in these accounts, providing a means to track the impacts of restoration over time.

When compiling an ecosystem extent account, it is important to clearly indicate the dates for the opening and closing stock. Where possible, records should also include information on activities that contributed to changes in extent—such as restoration interventions, natural regeneration, or degradation. This helps ensure transparency and supports interpretation of the data.

Table 1. Example ecosystem extent accounts for coastal ecosystems (illustrative example) (adapted from Loureiro et al., 2024)

	Ecosystem types					
	Estuary	Urban coastal area	Mangrove	Sandy beach	Seagrass	TOTAL
Opening extent (Km2)	22	15	29	13	21	100
Additions to extent	0	12	4	4		20
Managed expansion		12				12
Unmanaged expansion		0				0
Reductions in extent	0		6	8		14
Managed reductions		4	4	8		16
Unmanaged reductions				0		0
Net change in extent	0	8	-2	-4		+2
Closing extent (Km2)	22	23	27	9	21	102

Expansions of ecosystem coverage:

Additions to extent are increases in the area of a defined ecosystem and can be categorised as managed and unmanaged expansions.

- **Managed expansions** are increases in an area of an ecosystem that result from direct human activity, such as increases in ecosystem extent due to restoration activities (United Nations, 2024).
- **Unmanaged expansions**, on the other hand, are increases in the extent of an ecosystem driven by natural processes (United Nations, 2024), such as mangrove regeneration through natural seed dispersal.

Decreases in ecosystem coverage:

Reductions in extent are decreases in the area of a defined ecosystem.

- **Managed reductions** measure the decrease in an area from direct human activity (e.g., increase in coastal developments resulting in removal of habitat),
- **Unmanaged reductions** measure decreases that result from natural processes (e.g., loss of coral reefs due to climate change or extreme weather) (United Nations, 2024).

The spatially explicit nature of ocean accounts makes them particularly valuable in the marine realm, where ecological and jurisdictional boundaries are often fluid or undefined. Marine species frequently move across multiple habitat types and ecosystems (Lester *et al.* 2020), complicating the planning and design of marine restoration efforts. Because ecosystem accounts are spatially detailed, they can capture fine-scale variations in ecological conditions (Gaglio *et al.* 2024), helping practitioners better understand and respond to the dynamic nature of marine environments.

Ecosystem condition

Ecosystem condition accounts follow a similar format as extent accounts but record data on the state and functioning of ecosystem assets (United Nations 2024). The UN SEEA EA (2024) defines ecosystem condition as “the quality of an ecosystem measured in terms of its abiotic and biotic characteristics”. Examples of condition variables that can be included in accounts include:

- Coral condition (% living, % bleached)
- Seagrass shoot density and species composition
- Mangrove canopy cover and density of young plants
- Species diversity
- Level/concentration of relevant pollutants (ppm)

Restoration practitioners can use the condition variables that are most applicable to their project and the intended restoration outcomes. This flexibility is important, as each restoration intervention is likely to have unique objectives and desired outcomes. However, if the outcomes of restoration are linked to the ability of marine ecosystems to provide ecosystem services (discussed below under “Flow Accounts”), then the selected condition variable should reflect this relationship. In this case selected variables should be linked to the ecosystem service being provided.

Ocean accounts allow practitioners to select account types and variables that align with those specific goals, while still using a standardised structure that supports aggregation across projects and broader insight into seascape-scale outcomes. To provide a complete picture, it is important to include variables that can be positively or negatively affected by both restoration efforts and external pressures. The UN SEEA EA provides a common ecosystem condition typology (ECT) that can be used to help organise data based on ecosystem condition characteristics (United Nations 2024)[2]. Using this as a first step to identify relevant condition variables would allow practitioners to ensure that all relevant variables are captured. In this document we follow the framework for condition variables provided by GOAP's Technical Guidance and the UN SEEA EA.

Typically, ecosystem condition accounts are used to report on the opening and closing value of an indicator of ecosystem condition, or to report the total area of an ecosystem under a specific condition category (e.g. good, fair or poor condition). The opening condition can record the baseline data for the project against which changes will be measured (Table 2). Improvements and reductions, whether from natural regeneration, anthropogenic involvement or restoration activities, can also be recorded in this account. As indicated in Table 2, an increase in an ecosystem condition variable does not necessarily mean there has been a positive net change (e.g., invasive species increased from opening to closing). It is important for restoration projects to track individual variables that reflect specific aspects of ecosystem condition. However, changes in condition may result from a combination of factors—including restoration interventions, natural variability, or external pressures—making it essential to consider attribution when interpreting results. Recognising these drivers helps ensure that data from ocean accounts are used appropriately to inform decision-making and assess restoration effectiveness.

Table 2. Ecosystem condition account for a mangrove ecosystem (illustrative example) (Loureiro et al., 2024)

Variable	Opening	Closing	Change
Tree species richness (n)	4	3	-1
Tree density (tree/ha)	125	87	-38
Invasive fish species (n)	0	5	5
Dissolved oxygen (mg/L)	7	4	-3
Nitrate concentration (μmol/L)	8	18	10

Flow Accounts

Flow accounts, often referred to as supply and use accounts, organise data on the services and benefits provided by ecosystem assets, such as those recorded in asset accounts. They track an ecosystem's contribution to the economy in both physical (e.g. cubic metres of coastal floodwater buffered by wetlands) and monetary terms (e.g. avoided damage costs from storm surges due to coastal protection provided by wetlands). They can also capture flows from the economy back to the environment, such as pollution and other residuals. In marine ecosystem restoration, these accounts help

[2] For further information on ecosystem condition indicators and the ECT please refer to the UN SEEA EA https://seea.un.org/ecosystem-accounting

quantify ecosystem services and benefits over time, highlighting changes as restoration e￿orts progress.

Ecosystem services – the benefits humans get from marine ecosystems

A key type of flow account is **ecosystem services accounts**, which specifically track the services ecosystems provide to the economy and society. These benefits can be measured in physical terms (e.g., litres of water filtered by a shellfish reef or seagrass meadow) to assess ecological sustainability. They can also be expressed in monetary terms (e.g., cost savings from reduced water treatment) to support the integration of ecosystem services into economic planning and decision-making.

Under the SEEA EA framework, ecosystems services are divided into three main types: provisioning, regulating and cultural services (Table 3) (United Nations 2024). **Provisioning services** encompass the tangible benefits ecosystems provide, such as food, raw materials, and freshwater. **Regulating services** involve ecosystem processes that maintain environmental stability, including carbon sequestration, water purification, and coastal protection. **Cultural services** capture the non-material benefits ecosystems offer, such as recreation, spiritual value, and cultural heritage.

While we focus on the SEEA EA classification of ecosystem services in this document, this aligns closely with other global frameworks. One example is IPBES's 'Nature's Contributions to People' (Díaz *et al.* 2018), which similarly emphasises the diverse ways ecosystems support human well-being. Capturing the impacts of restoration efforts on the provision of ecosystem services is particularly valuable for restoration practitioners. Ecosystem service accounts enable the quantification of ecosystems services throughout the project lifespan, offering clear insights into the benefits of ecosystem restoration for both nature and society. The well-defined link between restoration and the provision of ecosystem services can help in both attracting funding and aligning projects with broader sustainability and biodiversity goals (discussed in more detail below).

Table 3. Types of ecosystem services with relevant examples and units. [3]

Ecosystem Service Type	Definition	Example	Units
Provisioning	Material benefits from goods derived from environmental assets	Fishing	Kg of fish caught
Regulating	Benefits from nature that regulate integral processes such as climate regulation	Carbon sequestration	Tonnes of carbon/Year
Cultural	Benefits from nature that impact human health and wellbeing	Nature tourism	£ spent on travel to island destination

Residual Flows – the impacts of human activities on marine ecosystems

In addition to measuring the benefits ecosystems provide, flow accounts also track **residual flows**—waste and emissions returning from the economy to the environment. These include pollution from wastewater, air emissions, and solid waste. GOAP's Technical Guidance (2021) highlights the need to estimate residual flows reaching the ocean from terrestrial, inland water, coastal, and marine sources. Understanding these flows is essential for assessing human impacts on marine ecosystems and informing policies aimed at reducing environmental degradation.

[3] For a more exhaustive list of ecosystem services, refer to the UN SEEA EA reference list of ecosystem services

EXAMPLE: Blue carbon ecosystem accounts

One type of flow account that has gained prominence in the marine space is carbon accounting. Carbon accounting is driven by the increasing focus on "blue carbon" ecosystems—marine habitats such as mangroves, seagrasses, and salt marshes that act as critical carbon sinks. Ocean accounts offer a comprehensive framework for carbon accounting by integrating asset and flow accounts. These accounts provide valuable insights into the current levels of carbon storage at restoration sites and quantify the benefits these carbon stocks offer, such as climate regulation and carbon sequestration. This structured approach helps restoration practitioners evaluate the potential of blue carbon ecosystems to contribute to both environmental and societal goals. A hypothetical example of a carbon accounts can be seen in Table 4.

Table 4. Carbon stock as a measurement of a mangrove ecosystem's ecosystem services (illustrative example)

	Carbon stock – physical (tonnes)	**Carbon stock – monetary (£GBP thousands)**
Opening	2870	146
Net carbon balance	+236	+12
Closing	3106	158

A critical consideration for blue carbon projects is the impact of climate change, including sea level rise, on ecosystem health and functionality (Wylie, Sutton-Grier, and Moore, 2016). Ecosystem service accounts can play a vital role by standardising data and methods used to measure these impacts on ecosystems and the communities that depend on them (Gacutan et al., 2022). For restoration practitioners, this provides a more reliable and quantitative basis for assessing the contribution of blue carbon ecosystems to nature and society. By capturing both ecological and socio-economic benefits, ecosystem service accounts help inform adaptive management strategies, support decision-making, and strengthen the case for investment in blue carbon restoration projects.

Monetary accounts

Alongside extent and condition, ecosystem asset accounts can incorporate monetary valuation to help estimate the economic importance of ecosystems. Under the SEEA EA framework, monetary asset accounts complement extent and condition accounts by assigning an economic value to ecosystems based on the benefits they provide over time. It should be noted that the monetary sections of the SEEA EA have not been adopted as the international standard, and there are a range of techniques used to assess monetary value. Each technique has limitations, and the technique should be chosen on a case-by-case basis.

To estimate the monetary value of an ecosystem asset, practitioners must first compile ecosystem services accounts that track key benefits such as water filtration, nutrient cycling, or coastal protection. Once quantified, these benefits form the basis for calculating the Net Present Value (NPV) — the total worth of all expected future benefits, adjusted to reflect their value today. For example, the NPV of a mangrove forest would combine long-term benefits like storm surge protection, fish nursery habitat, and carbon sequestration, using a discount rate to calculate their present economic value.

Calculating the NPV helps decision-makers understand the long-term economic value of restoring ecosystems compared to other land or resource uses. Assigning monetary values to ecosystems can be challenging since not all ecosystem services have direct market prices. A variety of valuation methods can be used. Market-based approaches apply existing prices (e.g., for fisheries), while non-market methods estimate values using techniques such as replacement cost (e.g., the cost of building sea walls if coastal protection were lost) or avoided damage (e.g., savings from reduced storm damage due to mangrove protection).[4]

Importantly, monetary asset accounts do not replace physical accounts. Instead, they complement them, providing a way to express ecosystem value in economic terms. Extent and condition accounts capture the size, health, and functionality of an ecosystem. Monetary asset accounts translate these benefits into a common monetary unit to support economic comparisons and integration into financial planning. To ensure well-informed decision-making for restoration projects, monetary valuation should be used alongside biophysical indicators.

Additional and novel accounts

Novel accounts, beyond those outlined in the SEEA EA, are also described within GOAP's Technical Guidance. Three examples of novel accounts include social, governance and risk accounts. As these accounts are still somewhat experimental, there are no pilots or case studies yet published for these account types. However, efforts to implement these novel accounts are ongoing, with guidance provided by GOAP. These three account types are highlighted in this guide because of their potential to support restoration practitioners at the project level.

Social accounts capture, analyse and report on data related to the social, cultural and equity dimensions of the human-ocean relationship (Shellock and James 2024). Social accounts integrate key data not captured in economic accounts to examine the

[4] For further information on monetary valuations please refer to GOAP's Technical Guidance.

interactions between nature and society. Data may include census data (e.g., population size and distribution) and labour statistics (e.g., informal employment rates and workforce composition). Social accounts could be used to capture how restoration practices improve local livelihoods through enhanced ecosystem services. Capturing this information not only allows restoration practitioners to demonstrate the broader value of restoration eorts to policymakers and funders, but also allows them to design projects that maximise the social benefits. GOAP recently published a briefing on social accounts for the ocean (Shellock and James 2024).

Ocean governance accounts organise different types of data to provide insights into the relationships between governments, or decision-making bodies, and society (Bordt *et al.* 2021). Governance accounts can be split into two categories. The first focusses on management structures, identifying who has jurisdictional control and influence over a certain area. This account type can include qualitative and quantitative information. The second category, environmental activity accounts, focus on economic activities directly related to ocean management, such as government spending, taxes and subsidies. Together, these accounts provide a comprehensive view of ocean-related governance and its impacts. Ocean governance accounts can be used to track key aspects of ocean marine policy and management, including marine spatial planning zones, protected area designations, financial incentives for ocean industries (such as taxation and subsidies), and policy measures aimed at marine conservation.

Risk accounts assess the potential risks faced by ecosystem and environmental assets from both anthropogenic and environmental hazards. Risk accounts have the potential to capture risks to ecosystems (e.g. from climate change or pollution), risks to people and the economy (e.g. loss of coastal protection or reduced water quality) and risk mitigation achieved through restoration (e.g. the extent to which restoration reduces flood risk or biodiversity loss). Risk accounts provide indicators such as risks from flooding or storm surges as well as the resilience level of an ecosystem, knowledge of which can be critical in informing restoration eorts. Risk accounts are not yet widely implemented, however information held in risk registers can be easily translated into an accounting format. An example of this can be seen in the UK's Natural Capital Risk Register (Lusardi *et al.*, 2024)(Lusardi *et al.* 2024). This register categorises the relative risk (high, medium or low) to natural capital assets and their associated environmental services. This could be captured within a risk account to allow the information to be interpreted alongside accounts capturing details of ecosystem changes. The development of risk accounts can help identify knowledge gaps in how environmental and human pressures—such as climate change, pollution, or land use change—impact ecosystem assets. These pressures can disrupt the ability of ecosystems to provide services like flood protection, water purification, or food provision (Mace *et al.* 2015). For ecosystem restoration, such risk assessments can help prioritise actions, address vulnerabilities, and ensure the sustainability of restored ecosystems by accounting for potential hazards and their impacts on ecosystem functionality. This enables practitioners to design targeted interventions that reduce vulnerability to key risks — such as flooding, pollution, or erosion—and enhance the long-term resilience of ecosystems.

Incorporating Accounts into Restoration Projects

Ocean accounts can be integrated into restoration projects from the start, and utilised throughout the project lifecycle, providing valuable insights and benefits at each phase (Figure 2). In this section we explore how ocean accounts can enhance marine restoration eorts by aligning with the components and subcomponents outlined in the UN Standards of Practice to Guide Ecosystem Restoration (Nelson *et al.* 2024, hereafter referred to as the "UN Standards"). Although not all restoration projects follow identical processes, these components represent key phases and are broadly applicable across most projects. Specific accounts can be incorporated into each component of ecosystem restoration, and suggestions are presented Table 5.

The UN Standards emphasise the importance of broad engagement, information sharing, and adaptive management as cross-cutting subcomponents that occur throughout the restoration process. These subcategories are not discussed individually but can be supported by ocean accounts as illustrated in figure 2.

Assessment

Prior to planning a restoration project, an assessment of the local ecological, cultural and socioeconomic conditions is needed to identify degradation levels and to define the restoration “vision” and targets (Nelson *et al.* 2024). This phase acknowledges the interconnectedness of ecosystems and their services with the wider seascape and society. The assessment should also inform how restoration can be designed to maximise benefits for both nature and people. Under the UN Standards, the assessment phase of a restoration project should also be used to determine the most suitable site location when several restoration opportunities are available, factoring in local community priorities (Nelson *et al.* 2024). Ocean accounts can assist in multiple aspects of the assessment phase, as outlined below.

Ocean accounts also offer tools to evaluate social and governance factors necessary at this stage, such as community reliance on ecosystem services or existing policy frameworks. To plan a successful restoration project, stakeholders must determine the current state of the ecosystem through a detailed inventory of the baseline conditions (Nelson *et al.* 2024). This should include the physical and biotic components, as well as the level of degradation (Nelson *et al.* 2024). This information can be integrated into the ocean accounting framework using ecosystem extent and condition accounts.

Ocean accounts can support the selection of restoration sites by providing a standardized framework to compare sites and assess the baseline of sites so that the potential benefits of restoration can be estimated. Weighing the costs and benefits of different scales of restoration projects is essential for selecting sites that maximise the ecological and social outcomes. In addition to extent and condition asset accounts, physical and monetary ecosystem service flow accounts can support the evaluation of how benefits—such as carbon sequestration and fisheries productivity—vary across sites and scales. Social accounts systematically organize information on the societal components that are relevant for site selection, including poverty, inequality and social exclusion. Governance accounts are also useful for site selection as they provide a robust way to help to understand the governance structures and overlapping jurisdictions in an area.

Ocean accounts focus not only on ecosystems, but also their interactions with the wider economy and society. By integrating data on ecosystem extent and condition alongside information on ecosystem services, economic activities and governance, accounts can provide a holistic view of how ecosystems interact with and support society. Developed ocean accounts can incorporate a wide range of information necessary for informed decision-making. Ocean ecosystem accounts, with their spatial framework, enable practitioners to assess not only the restoration site itself but also its connections to surrounding ecosystems. Flow to the environment accounts collect data on residuals such as pollution, providing valuable insights into external pressures from the economy that might impact an ecosystem. Collating this information helps practitioners evaluate whether restoration targets are achievable, or whether external factors, such as pollution, pose a significant risk to success. This comprehensive assessment ensures that potential barriers are identified early, guiding better site selection and planning.

Planning and Design

Site selection is a critical component of the restoration planning and design phase, as it shapes the ecological, social, and economic outcomes of a project. However, selecting the most appropriate site can be challenging due to spatial variation in ecosystem services and diering levels of ecological degradation (Lester *et al.*, 2020). While site selection is often guided by ecological factors, the process should also account for governance structures and local decision-making processes, which can significantly influence the feasibility, effectiveness, and long-term sustainability of restoration efforts.

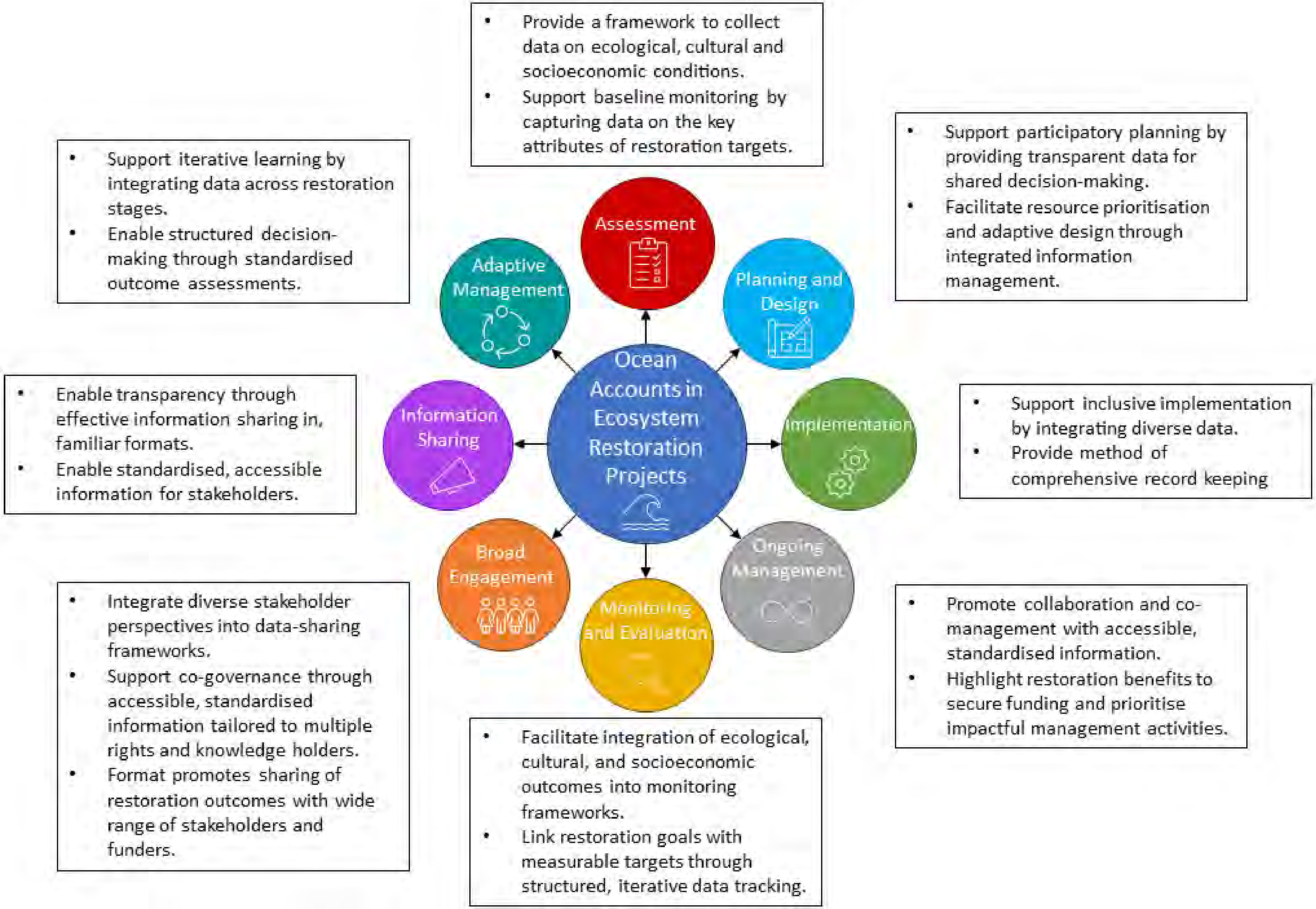

Figure 2. *The potential of ocean accounts to support the five components of the restoration process (Assessment, Planning and Design, Implementation, Ongoing Management, Monitoring and Evaluation) and the three cross-cutting subcomponents that apply throughout (Broad Engagement, Information Sharing and Adaptive Management). Adapted from the UN Standards to Guide Ecosystem Restoration, Figure 3 (Nelson et al. 2023).*

Table 5*. An indication of the potential for specific ocean accounts to be used in each component of the restoration process. Please note that this is just a guide, and that the use of specific accounts will depend on the individual restoration project.*

Component of Ecosystem Restoration	**Ocean Account Type**						
	Environmental Asset Accounts	Flows to the Environment (residuals)	Flows to the Economy	Ocean Economy Accounts	Social Accounts	Governance Accounts	Risk Accounts
Assessment	X	X			X	X	X
Planning and Design			X		X	X	X
Implementation	X	X	X	X	X	X	X
Ongoing Management	X	X	X	X	X	X	X
Monitoring and Evaluation	X	X	X		X	X	X
Broad Engagement					X	X	
Information Sharing	X	X	X	X	X	X	X
Adaptive Management	X					X	X

A strong ecosystem restoration plan includes several core elements to guide e ective and inclusive implementation. These include clearly defined restoration targets, timelines, financial requirements, and strategies for stakeholder engagement and capacity development (Nelson *et al.* 2024). It is also essential to recognise and integrate the rights of Indigenous Peoples, including land ownership and tenure rights, to ensure restoration eorts are equitable and inclusive. During this phase, ocean accounts can support capacity development by providing standardised, accessible evidence—such as ecosystem condition or services accounts—that can be shared across diverse stakeholder groups.

Even with a well-developed restoration plan, projects are likely to face challenges in the form of risks that could affect implementation. The UN Standards identify five key types of risks: environmental, technical, human conflict, war or catastrophe, and unintended consequences from restoration itself.[5] **To address these challenges, a risk assessment and management plan should be established outset and revisited regularly throughout project.** Risk management is critical for marine restoration projects, as their success is often tied to achieving a return on investment. Without a clear understanding of current and future risks to a restoration site, investors are less likely to support a project, making risk management an essential component of restoration planning and implementation. **Ocean accounts can play a key role in identifying and assessing risks by measuring relevant risk indicators across environmental, economic and social dimensions.** Their holistic perspective allows practitioners to determine how reliant an economy or society is on a specific ecosystem service.

> **Example:**
>
> A 2021 study by Farrell et al. demonstrated this concept in peatland ecosystems in Ireland through the development of a natural capital risk register. Ecosystem accounts were used to enable evidence-based prioritisation, risk identification and restoration planning. The study categorised risks to peatland habitats and found that while some habitats were suitable for restoration to mitigate risks, others had crossed critical thresholds, making restoration efforts unfeasible. These findings highlight the importance of organising and categorising risks to prioritise restoration sites effectively, ensuring optimal returns on restoration investment and reducing uncertainties for stakeholders.

Implementation

Restoration activities should be implemented in a way that maximises benefits for nature and people. In order to maximise benefits for people, their needs need to be understood and opinions need to be taken account of within decision making. Mechanisms such as participatory governance and the integration of social fairness and

[5] For further information on the types of risk relevant to restoration please refer to the UN Standards of Practice to Guide Ecosystem Restoration

equity considerations into project design and management can help identify pathways to deliver benefits for people.

Data management, though essential, is often overlooked or insuicient in restoration projects (Nelson *et al.* 2024)**.** Ocean accounts can address this gap by providing a standardised framework for data collection at regular intervals (e.g., annually, biannually, monthly, etc.). These accounts can enable restoration practitioners to document the changes in ecosystem condition, extent and services for the area being restored. The spatially explicit nature of ocean accounts is particularly valuable in tracking interventions, allowing practitioners to map where actions occurred and assess their localised or broader eects on ecosystem services. This detailed record-keeping ensures transparency, facilitates adaptive management, and provides the evidence needed to evaluate restoration success. **By integrating spatially and temporally consistent data, ocean accounts can guide management and demonstrate success, enhancing implementation eectiveness and long-term impact.**

Ongoing Management

Practical, affordable and sustainable plans for ongoing management and suicient funding are crucial for this phase of ecosystem restoration. Ongoing management, often referred to as maintenance, is required to ensure the long-term success and sustained benefits of ecosystem restoration efforts following the completion of initial activities (Nelson *et al.* 2024). It is unlikely that the provision of ecological, cultural, and socioeconomic benefits will continue as intended if restoration sites are not revisited (Nelson *et al.* 2024). However, funding for this stage is generally limited.

Ocean accounts can provide essential evidence to inform the development of ongoing management plans. By compiling baseline and restoration outcome data in a structured, standardised format, accounts help practitioners establish clear objectives and measurable targets for long-term site management. For example, quantifying the ecosystem services provided by a restoration site can support the prioritisation of management activities based on their ecological and economic value.

Beyond informing initial planning, the continued compilation of data into ocean accounts supports adaptive management by tracking how ecosystem condition, extent, and services change over time. Time-series data allow practitioners to assess the eectiveness of restoration interventions, identify emerging challenges or opportunities, and adjust management strategies accordingly. This ongoing, evidence-based approach helps ensure restoration efforts remain e ective and responsive throughout the project lifecycle.

Monitoring and Evaluation

Eective monitoring and evaluation of restoration activities and outcomes is crucial to the both the success and adaptive management of restoration activities. Ecosystem restoration is inherently a long-term process, often accompanied by significant uncertainties, particularly in the context of the unknowns introduced by climate change. By systematically tracking progress, practitioners can identify which actions are effective and expand them, refine promising approaches, and discontinue strategies that are not yielding desired results (Nelson *et al.* 2024).

Ocean accounts can be particularly useful in data collection, management, analysis and evaluation throughout the project lifecycle. For data collection, they help identify consistent protocols and indicators across contributors and timeframes, reducing duplication and gaps. In terms of management, ocean accounts oer a structured format for collating and storing data in a way that supports long-term accessibility and use. Their standardised structure also enables consistent and repeatable analysis, allowing practitioners to track changes and relationships across environmental, social, and economic dimensions. This, in turn, supports robust evaluation by revealing trends and patterns over time, enabling practitioners to assess the eectiveness of restoration activities and adjust strategies where needed.

Ocean accounts could also be used to promote the scaling up of restoration eorts. Scaling up ecosystem restoration is not always easy, requiring specific expertise, local scale eorts, multistakeholder governance structures, and clarity on acceptable trade- o s between competing objectives and policies (Rodrigues *et al.* 2009; Baker, Eckerberg and Zachrisson 2014; Murcia *et al.*,2016). Ocean accounts provide a powerful tool to address these challenges by oering a standardised framework for tracking and integrating data on ecosystem extent, condition, and services across diﬀerent scales. By linking local restoration efforts to national and regional strategies, ocean accounts help ensure that site-specific projects contribute meaningfully to larger conservation goals. A key advantage of using ocean accounts is their ability to connect restoration data with policy and financial decision-making. They facilitate the integration of social, economic, and ecological data, helping decision-makers balance trade-os and optimise resource allocation. By standardising reporting and fostering knowledge-sharing, ocean accounts enable collaboration among practitioners, researchers, and policymakers, ensuring that restoration e orts are both scalable and sustainable.

The monitoring and evaluation of restoration efforts is also crucial in communicating the benefits of ecosystem restoration for biodiversity, ecosystem integrity and human wellbeing (Nelson *et al.*, 2024). **Ocean accounts allow practitioners to communicate benefits effectively to funders, policymakers, and the public. They showcase contributions to biodiversity conservation, climate resilience, and socioeconomic**

development. This not only fosters greater support for restoration initiatives but also builds a stronger case for scaling up successful strategies.

Aligning ecosystem restoration with national and international commitments through ocean accounts

Aligning restoration projects with national and international commitments can enhance the impact and visibility of the restoration eorts themselves, while also contributing meaningfully to broader environmental and societal goals. Restoration projects can be designed to support implementation of specific targets outlined in relevant national, regional and international policy frameworks. This alignment helps attract interest and investment from funders, policymakers, and stakeholders, who increasingly prioritise initiatives that demonstrate measurable progress towards established policy objectives. Strategically linking restoration to these goals not only raises the profile of individual projects but also improves their chances of securing longterm policy support, financial resources, and public engagement. Framing restoration within the context of global ambitions enables projects to access wider networks and contribute to shared outcomes across scales.

Ocean accounts oer a tool that can help bridge the gap between local actions with global ambitions. Ocean accounts oer a tool to bridge the gap between local restoration actions and global commitments. By incorporating ocean accounts into restoration projects, practitioners can track outcomes over time, evaluate their contribution to policy targets, and report progress in a clear and consistent manner. This standardised approach facilitates transparent communication with decision-makers and stakeholders, making it easier to demonstrate how restoration contributes to broader sustainability goals. In doing so, ocean accounts can enhance accountability, attract investment, and promote collaboration—helping to scale up restoration eorts and deliver lasting ecological, social, and economic benefits. Here we explore the potential of ocean accounts to enhance the alignment of restoration projects with various national and international commitments. While not exhaustive, the commitments discussed here represent key frameworks that guide countries' efforts in biodiversity, sustainable development, and climate resilience.

Rio Conventions

The Rio Conventions address the interconnected global challenges of biodiversity loss, climate change, and land degradation, recognising the need for coordinated international action. Adopted at the 1992 Earth Summit in Rio de Janeiro, Brazil, the three conventions include the United Nations Framework Convention on Climate Change

(UNFCCC), the Convention on Biological Diversity (CBD), and the United Nations Convention to Combat Desertification (UNCCD). Marine ecosystem restoration supports the objectives of all three conventions by restoring biodiversity, enhancing carbon sequestration and climate resilience, and improving the health of coastal areas that form critical land-sea interfaces. By rebuilding degraded marine and coastal ecosystems, restoration offers a nature-based solution that simultaneously contributes to climate mitigation and adaptation, biodiversity recovery, and the prevention of land and soil degradation.

2030 Agenda for Sustainable Development and its Sustainable Development Goals

The 2030 Agenda for Sustainable Development, adopted by the United Nations General Assembly in 2015, represent a global commitment to ending poverty, safeguarding the environment, and promoting peace and prosperity for all by 2030. Marine ecosystem restoration can contribute to progress towards the SDGs.

Marine ecosystem restoration outcomes support SDG 14 (Life Below Water) targets, including protecting and restoring ecosystems, increasing scientific knowledge and technological innovation for ocean health, supporting small-scale fishers, and enhancing economic benefits from the sustainable use of marine resources. By improving the condition and extent of marine ecosystems, restoration activities help safeguard biodiversity, strengthen marine habitats, and promote sustainable livelihoods for coastal communities.

Alongside this, restoration efforts contribute to SDG 13 (Climate Action) by strengthening resilience and adaptive capacity to climate-related hazards and enhancing efforts to mitigate and adapt to climate change. For example, restoring blue carbon ecosystems such as mangroves, seagrasses, and salt marshes enhances carbon sequestration, reduces vulnerability to storm surges and flooding, and helps communities build resilience to climate impacts.

Beyond these two goals, marine ecosystem restoration efforts can support SDG 1 (No Poverty) and SDG 2 (Zero Hunger) through enhancing fisheries and improving food security. Restoration enhances the health and productivity of marine ecosystems, which underpin a wide range of ocean-based livelihoods—from tourism and transport to aquaculture, harvesting of marine materials, and small-scale enterprise. By improving ecosystem condition and stability, restoration helps sustain and create decent work opportunities, especially for coastal communities that depend directly on the ocean economy. In terms of food security (SDG 2), restored marine habitats such as seagrass meadows, coral reefs, and mangroves support vital ecosystem functions that maintain food availability. These habitats serve as breeding and nursery grounds for marine species, contributing to more reliable and resilient food systems while supporting sustainable harvests over the long term.

Kunming-Montreal Global Biodiversity Framework

The Kunming-Montreal Global Biodiversity Framework is a landmark international instrument adopted in 2022 under the Convention on Biological Diversity. The Framework builds on the Convention's previous Strategic Plan and supports the achievement of the 2030 Agenda for Sustainable Development. It sets out an ambitious pathway toward the global vision of a world living in harmony with nature by 2050. The Framework includes four long-term goals for 2050 and 23 action-oriented targets to be achieved by 2030, aimed at halting and reversing biodiversity loss.

Ecosystem restoration is an element of the Kunming-Montreal Global Biodiversity Framework, with targets aiming to restore degraded ecosystems and enhance the sustainable use of natural resources. Restoration efforts contribute directly to the achievement of targets under the Global Biodiversity Framework by rehabilitating degraded ecosystems, supporting species recovery, and improving the capacity of ecosystems to provide essential services such as carbon sequestration, fisheries productivity, and coastal protection.

National biodiversity strategies and action plans (NBSAPs) are the main instrument for implementation of the Convention of Biological Diversity (CBD). They outline national strategies to achieve the objectives of the Convention. Restoration activities may support the achievement of restoration-focused national biodiversity targets decided by some countries. These activities may include those that aim to improve ecosystem condition, restore critical habitats, and/or bolster the provision of ecosystem services such as carbon sequestration, fisheries productivity, and coastal protection, which may be elements include in NBSAPs.

United Nations Framework Convention on Climate Change and the Paris Agreement

Under the Paris Agreement, nationally determined contributions (NDCs) reflect a country's commitment to reducing greenhouse gas emissions and building resilience to climate change. These commitments are to be updated at regular intervals. Restoration projects that enhance carbon storage, such as the restoration of mangroves, saltmarshes and seagrass meadows, contribute to these goals by enhancing carbon sequestration, improving ecosystem resilience, and reducing vulnerability to climate-related risks like storm surges and coastal flooding. Restoring degraded marine and coastal ecosystems can contribute to meeting national emissions reduction targets while simultaneously building adaptive capacity and safeguarding communities reliant on ecosystem services.

Regional Seas Conventions

Regional Seas Conventions and Action Plans are agreements among countries sharing a common body of water, focussed on enhancing the health and sustainable management of marine and coastal ecosystems. Restoration activities, such as rehabilitating coral reefs, mangroves, and seagrasses, directly contribute these goals by improving ecosystem health, enhancing biodiversity, and mitigating pollution. These eorts address regional challenges like habitat degradation, overfishing, and pollution, aligning with the conventions' objectives to maintain ecological integrity and support sustainable development.

The role of ocean accounts in supporting global and national commitments

Ocean accounts provide a structured, standardised, and transparent framework that enables restoration practitioners and policymakers to better align marine ecosystem restoration efforts with global and national commitments. Ocean accounts offer several cross-cutting benefits:

- **Measurement and monitoring:** Ocean accounts enable systematic tracking of changes in ecosystem extent, condition, and services over time, offering robust evidence to assess progress toward restoration and biodiversity targets.
- **Standardisation and transparency:** By aligning with internationally recognised accounting frameworks, such as the SNA and SEEA, ocean accounts ensure that restoration outcomes are reported in a consistent and comparable format, supporting national reporting and international comparability.
- **Evidence for decision-making:** Accounts provide policymakers, funders, and stakeholders with integrated data that links ecological change to economic and societal benefits—such as carbon sequestration, improved fisheries, or coastal protection—strengthening the case for investment and policy support.
- **Identify opportunities to align with priorities**: Ocean accounts help to identify restoration opportunities that align with biodiversity, climate, and sustainable development objectives, ensuring that restoration efforts contribute meaningfully to broader societal goals.
- **Support for adaptive management**: Through ongoing data collection and time-series analysis, ocean accounts help practitioners evaluate the effectiveness of interventions and adjust strategies over time to maximise impact.
- **Facilitation of reporting obligations**: Whether as a response to national reporting obligations under multilateral environmental agreements such as CBD or the Paris Agreement; or to communicate progress reporting under SDG frameworks, ocean accounts offer a consistent data foundation to meet reporting requirements efficiently and credibly.

By bridging the gap between ecological outcomes and policy priorities, ocean accounts help ensure that marine restoration efforts are not only ecologically e ective but also socially and politically strategic. This positions them as a valuable tool to attract longterm support and contribute to global sustainability goals.

Harnessing Ocean Accounts for Marine Ecosystem Restoration: Lessons from Indonesia and Costa Rica

Several countries have embraced the use of ocean accounts to support marine conservation initiatives and sustainable resource management. In this section we explore the implementation of ocean accounts in Indonesia and Costa Rica, showcasing their potential to enhance marine ecosystem restoration eorts.

The government of Indonesia has committed to using ocean accounts to measure the biophysical and monetary value of their marine assets. These accounts include mapping areas of marine degradation and assessing the potential costs of rehabilitating these sites, providing a structured approach to managing and restoring critical ecosystems. This work is supported by Indonesia's innovative ocean accounts dashboard**,** a platform that integrates and visualises data on marine ecosystems, their condition, and their economic and social values. The dashboard oers stakeholders an accessible interface to monitor marine asset health, track restoration progress, and evaluate the impacts of marine policies, further enhancing the country's capacity to utilise ocean accounts eectively. With 16% of the world's coral reefs, Indonesia holds the largest share globally and hosts the most extensive coral reef restoration programmes of any country (Lamont et al., 2022). This unique combination of natural resources, restoration leadership, and advanced ocean accounting systems positions Indonesia as a global leader in marine conservation.

A key approach in Indonesia's coral restoration programmes is evidence-based adaptive management, which emphasises consistent monitoring of ecological, social, and economic data. Early monitoring has proven essential for adaptive management, enabling restoration practitioners to address risks promptly and scale up successful restoration activities. Indonesia's strong foundation in ocean accounting, combined with its deep local expertise in restoration, presents a valuable opportunity to use ocean accounts to strengthen the impact and effctiveness of restoration projects. These accounts could provide a standardised framework for tracking progress, evaluating restoration outcomes, and aligning local efforts with broader national and international sustainability goals, further positioning Indonesia as a global leader in marine conservation and restoration.

Costa Rica's government has committed to establish their first comprehensive ocean account by 2030[6] **with the primary goal of assessing the condition of its marine ecosystems and the flow of ecosystem services derived from these assets.** Building on experience with natural capital accounting for terrestrial ecosystems, this initiative represents a natural progression towards integrating marine ecosystems into the country's national accounting framework. Costa Rica's leadership in coral reef restoration is emblematic of a broader trend in Latin America, where such eorts are gaining prominence. A comprehensive study of marine restoration projects in the region revealed that practitioners have successfully navigated the high costs of restoration, but few projects have incorporated measurable indicators to track progress. This limits their scalability and broader impact (Bayraktarov et al., 2020).

This gap highlights the untapped potential of ocean accounts as a tool for bridging the divide between restoration practices and long-term monitoring and evaluation. By providing a structured, standardised framework, ocean accounts can equip restoration practitioners with the data needed to expand the scale of their e orts, manage risks, and address challenges more effectively. Integrating ocean accounts into restoration initiatives can ensure measurable social and ecological outcomes, making restoration e orts more transparent, scalable, and aligned with national and international sustainability goals. Similar to Indonesia, Costa Rica's commitment to ocean accounts positions it as a potential leader in connecting data-driven marine restoration with broader conservation strategies.

[6] For more information on Costa Rica's experience in ocean accounting please refer to https://www.oceanaccounts.org/accounting-for-the-costa-rican-oceans/

Conclusion

Ocean accounts oer a structured and standardised approach to data collection and collation, enabling more consistent and transparent restoration reporting. Incorporating ocean accounts into marine ecosystem restoration projects provides restoration practitioners with a powerful tool to enhance evidence-based decision-making. It also improves project transparency and helps secure long-term financial and policy support. By systematically capturing data on ecosystem assets and economic interactions, ocean accounts offer a structured framework for tracking restoration outcomes. Ensuring that restoration eorts are not only ecologically eective but also economically and socially impactful, can help make a stronger case for continued investment in restoration.

Throughout the restoration lifecycle, ocean accounts can support adaptive management. By structuring data in a time-series format, ocean accounts allow practitioners to track changes in ecosystem extent, condition, and services over time. This enables early identification of emerging trends, such as improvements in biodiversity, declines in habitat quality, or shifts in the provision of ecosystem services. Insights gained from ocean accounts can inform real-time adjustments to restoration strategies, ensuring eorts remain targeted and responsive. Ocean accounts also help evaluate the relative impact of dierent interventions—whether ecological, economic, or social—enabling practitioners to prioritise actions that deliver the greatest long-term benefits. By making these patterns visible, ocean accounts support a continuous feedback loop between monitoring, evaluation, and decision-making, which is essential for eective adaptive management.

Ocean accounts align with international statistical frameworks like the SNA and SEEA. They therefore oer a common language that resonates with key decision-makers and potential funders. The compatibility of ocean accounts with internationally recognised accounting standards strengthens communication with policymakers, funders, and investors. This enables restoration practitioners to position their work within broader economic and sustainability agendas.

Ocean accounts can bridge the gap between local action and global priorities, demonstrating how restoration initiatives align with national and international commitments. This enables practitioners to demonstrate how individual projects contribute to broader national and international commitments. By linking ecological, social, and economic data to recognised targets and indicators, ocean accounts help ensure that local restoration efforts are visible, measurable, and meaningful within national reporting systems.

Restoration practitioners are uniquely placed to lead in applying and advancing ocean accounts within marine restoration. While developing ocean accounts requires an initial investment of time and resources, the long-term benefits—from enhanced project credibility and increased funding opportunities to more e ective restoration outcomes—make it a worthwhile endeavour. By embracing ocean accounts, restoration practitioners can scale up their impact, promote a culture of accountability, and contribute to a global movement that recognises and values marine ecosystems as essential to both environmental sustainability and economic prosperity.

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