

General Introduction to Ocean Accounts

Explains what ocean accounts are and how they work, in terms that make sense to economists, ecologists, and policymakers alike.

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OUTCOME

After reading this Circular, you will be able to explain what ocean accounts are and how they work, in terms that make sense to economists, ecologists, and policymakers alike. You will understand the core framework that organises ocean-society-economy interactions, recognise how ocean accounts connect to established international standards – the System of National Accounts (SNA) and the System of Environmental-Economic Accounting (SEEA), both defined in the [TG-0.6 Glossary of Key Terms](#) – and identify practical starting points for implementation.

CONTENTS

1. Outcome	3
2. Requirements	3
3. Guidance Material	3
3.1 Sustainable development of the ocean	3
3.2 Information requirements for sustainable development decision-making	3
3.3 Definition and scope of ocean accounts	4
3.4 Functional components of ocean accounts	4
3.5 Conceptual components of the Ocean Accounts Framework	6
3.6 Relationship to other standards and approaches	10
3.7 Data quality and uncertainty	11
3.8 Implementation approaches and starting points	11
4. Acknowledgements	12
5. References	12

ABOUT THIS CIRCULAR

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1. Outcome

¶1 After reading this Circular, you will be able to explain what ocean accounts are and how they work, in terms that make sense to economists, ecologists, and policymakers alike. You will understand the core framework that organises ocean-society-economy interactions, recognise how ocean accounts connect to established international standards – the System of National Accounts (SNA) and the System of Environmental-Economic Accounting (SEEA), both defined in the [TG-0.6 Glossary of Key Terms](#) – and identify practical starting points for implementation.

2. Requirements

¶1 None: this Circular introduces the Technical Guidance on Ocean Accounts for Sustainable Ocean Development as a whole.

¶2 New to ocean accounting?

¶3 If you find the material challenging, consider starting with TG-0.5 Navigating the Technical Guidance to find a reading pathway matched to your role, or consult the [TG-0.6 Glossary of Key Terms](#) for unfamiliar terms.

3. Guidance Material

3.1 Sustainable development of the ocean

¶1 Sustainable development requires maintaining or enhancing the assets that future generations will need¹. These include produced and financial capital, and also natural capital, which the 2025 SNA defines as the combination of natural resources (such as mineral and energy resources, biological resources, and water resources) and ecosystem assets (spatially defined areas of ecosystems, measured through SEEA Ecosystem Accounting)^{2, 3, 4}. The 2025 SNA formally locates natural capital within a broader multiple-capitals framework alongside produced capital, human capital, and social capital (Chapters 2, 34 and 35)⁴.

¶2 The ocean contains and supports a wide range of these natural capital assets: individual environmental assets located in the ocean (such as aquatic resources and seabed mineral and energy resources, as defined in the SEEA Central Framework), marine and coastal ecosystem assets (as defined in SEEA Ecosystem Accounting), and produced assets supporting ocean economic activity (as defined in the SNA)^{5, 6}. The ocean water body itself is not treated as an environmental asset in the SEEA framework, because the stock of water is too large to be meaningful for analytical purposes (SEEA CF para 2.102)⁵. This exclusion does not limit the measurement of individual assets within the ocean, such as fish stocks and seabed minerals.

¶3 Sustainable ocean development entails three interconnected objectives: (1) advancing ocean-based economic activities that provide sustainable livelihoods, (2) ensuring equitable distribution of benefits across society, and (3) conserving and enhancing marine ecosystems and their ecological processes⁷. These objectives are inseparable: a fishery that collapses undermines both economic output and coastal community wellbeing.

3.2 Information requirements for sustainable development decision-making

¶1 Traditional economic indicators such as GDP cannot answer the key questions facing ocean managers: GDP does not capture environmental depletion, equity considerations, or values not traded in markets^{8, 9}. International commitments now require better measurement: CBD Decisions 15/24 (2022) and 16/1 (2024) call on countries to integrate biodiversity and ecosystem values into national accounting frameworks, including through ocean accounts.

¶2 The information requirements for sustainable ocean development reduce to three questions¹⁰:

1. ¶3 **What is the current economic output from ocean-related activities?** This establishes the scale and composition of the ocean economy.
2. ¶4 **What benefits (and disbenefits) do people and communities derive from the ocean, and how are these distributed?** This identifies who gains, who loses, and whether ocean development is equitable.
3. ¶5 **Is ocean development sustainable over time?** This question turns on whether the asset base (natural, produced, human, and social capital) is being maintained or depleted.

¶6 Answering these questions requires indicators spanning ocean production, ocean income (including physical measures of ecosystem services and monetary measures disaggregated across population segments), and changes in ocean balance sheets as sustainability indicators.

3.3 Definition and scope of ocean accounts

¶1 Ocean accounts give countries a common, structured way to measure the ocean, its importance to people, and what people are doing to change it¹¹. They bring together environmental, economic, and social data into a single coherent framework, so that a fisheries scientist, a national accountant, and a coastal community planner can all work from the same evidence base.

¶2 Three characteristics distinguish ocean accounts from other ocean-related information compilations:

1. ¶3 **They follow the Ocean Accounts Framework presented in this Technical Guidance (introduced in Section 3.5).** Data from different agencies and domains are organised consistently, enabling comparison across sectors, regions, and time periods.
2. ¶4 **They are compatible with international statistical standards, in particular the SNA and SEEA.** Ocean accounts speak the same language as national economic accounts, so ocean data can be directly compared with GDP figures and other official statistics.
3. ¶5 **They adhere to the principles of official statistics.** The information meets quality standards required for policy decision-making: transparent, reproducible, and independently verifiable^{12, 13}.

¶6 The framework covers marine and coastal areas within national jurisdictions (territorial waters, exclusive economic zones, continental shelves) and can be applied to particular areas within these zones (e.g., bays, protected areas). It is also applicable to activities functionally connected with but spatially separate from the ocean (e.g. nutrient pollution from inland agriculture), and to areas beyond national jurisdiction though with added conceptual challenges.

¶7 Whilst ocean accounts can include economic valuation of some ocean assets and services, they do not aim to determine a single 'total value' of the ocean, which would be both conceptually problematic and practically impossible¹⁴.

3.4 Functional components of ocean accounts

¶1 Ocean accounts function as an information pipeline: diverse data sources feed into a validation layer where statistical standards are applied to produce standardised accounts, from which indicators and reports are derived for decision-makers.

¶2 Figure 0.1.1 below sets out the four stages of this pipeline. Reading from bottom to top:

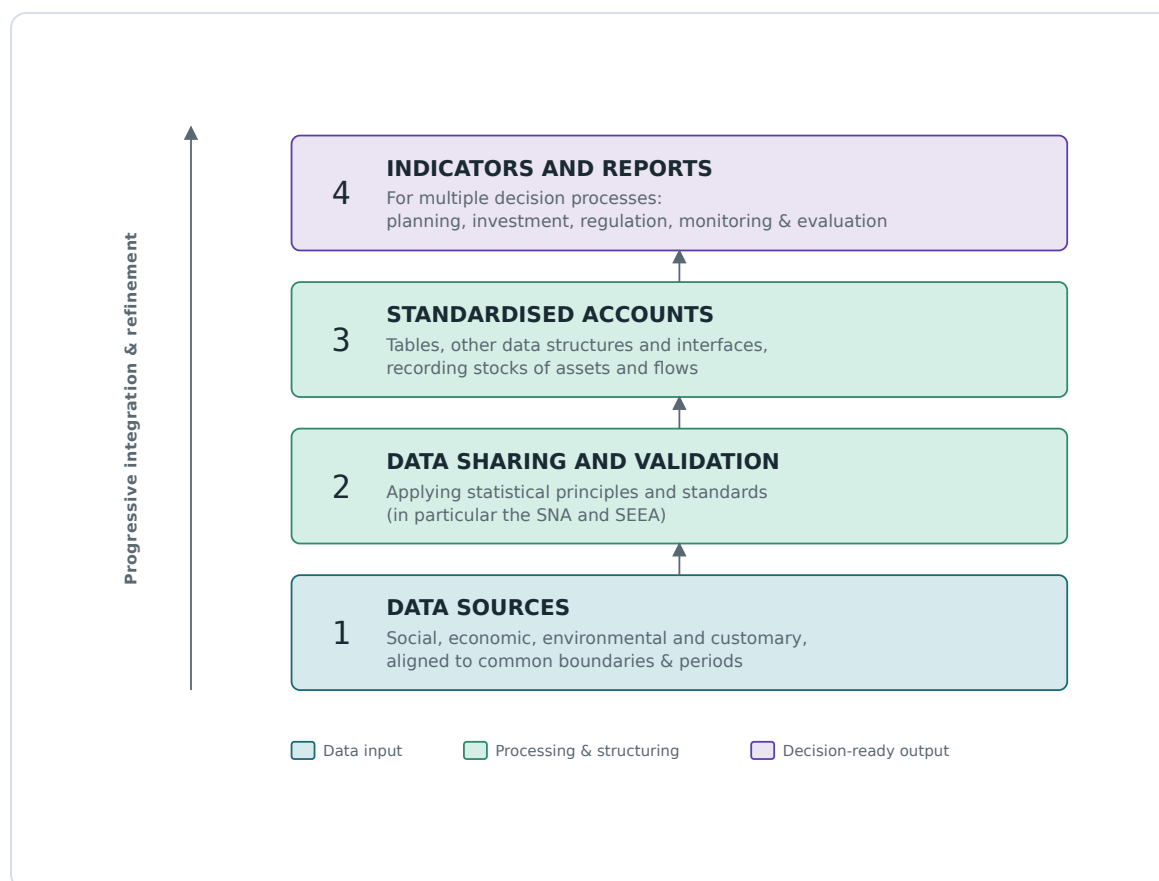


Figure 0.1.1 Four stacked stages show progressive integration from raw data sources to decision-ready indicators and reports. Read bottom to top; each stage adds integration relative to the one below.

Source: TG-0.1 §3.4 (functional components of ocean accounts).

Adapted from: Global Ocean Accounts Partnership, Technical Guidance on Ocean Accounting (2021), functional structure of ocean accounts.

¶3 The construction of ocean accounts begins with data collection and compilation from numerous sources: government agencies, research institutions, industry bodies, citizen science programmes, and indigenous knowledge systems. These data span environmental monitoring, economic statistics, social surveys, governance information, geospatial observations, customary knowledge, and many others¹⁵. A necessary step is aligning these heterogeneous datasets to common spatial boundaries, classifications, and accounting periods, through data sharing and validation processes that apply the relevant international statistical principles and standards (in particular the SNA and SEEA).

¶4 Raw data are then organised into standardised accounting tables or other data structures (e.g. non-relational JSON objects) in accordance with the Ocean Accounts Framework. These structures distinguish between:

- ¶5 **Stocks of assets:** levels measured or valued at a point in time (for example fish biomass, coral reefs, or coastal infrastructure).
- ¶6 **Flows of goods, (dis)services or activities:** physical or monetary transfers, measured or valued over an accounting period, between assets and/or social or economic sectors (for example fish harvest, coastal protection from mangrove forests, pollution of the environment by economic activity).

¶7 From these tables, analysts or automated systems derive indicators and visualisations that condense complex information into decision-relevant metrics for planning, investment, regulation, monitoring and evaluation, and reporting¹⁶.

3.5 Conceptual components of the Ocean Accounts Framework

¶1 The Ocean Accounts Framework starts from a central premise: the economy is embedded within the environment rather than sitting alongside it¹⁷. A fishing industry employs people in coastal communities (the economy is embedded within society), and those communities depend on healthy fish stocks (society is embedded within the environment). Damage to one layer propagates inward to the layers it contains, and improvements to one layer carry through to the others.

¶2 The Framework calls this arrangement a nested superset structure. The three domains (Economy, Society, and Environment) are concentric layers. The Framework distinguishes between flows (measurements of supply, use, activity or interaction) and stocks (measurements of asset status, extent and/or condition), each organised into three nested domain groups (Figure 0.1.2)¹⁸.

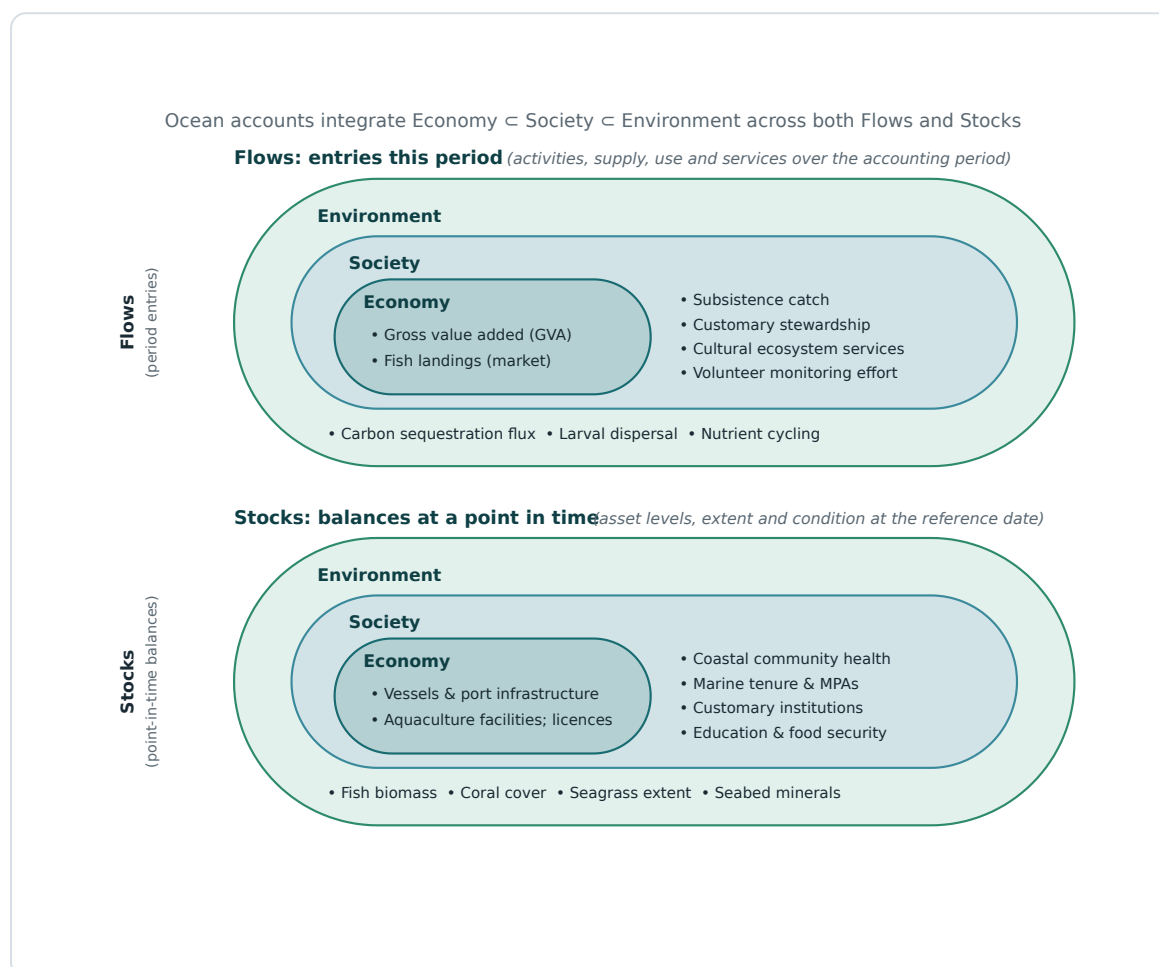


Figure 0.1.2 Economy sits nested within Society within Environment, shown separately for flows over the period and stocks at a point in time. Example entries illustrate the kinds of measurement each ring contributes.

Source: SEEA EA 2024 §2.21-2.24 (SNA/SEEA boundary, ecosystem-economy interactions); 2025 SNA §34.1 (multiple-capitals framework and the SNA production boundary).

Adapted from: GOAP Diagnostic Tool (2023); SEEA EA 2024 §2.21-2.24; 2025 SNA Chapter 34.

¶3 This nested conception aligns with the multiple-capitals framework adopted by the 2025 SNA, which identifies produced capital, human capital, social capital, and natural capital as the four pillars of sustainable wellbeing (Chapters 2, 34 and 35)⁴. The Framework also supports integrated accounting for qualitative and quantitative data drawn from multiple knowledge systems. In many countries, traditional knowledge systems do not make clear distinctions between people and nature.

¶4 The **accounting relationships** between domain groups define the subject matter of the Technical Guidance Circulars. Figure 0.1.3 below illustrates the principal categories of accounting

relationship between flow groups and stock groups.

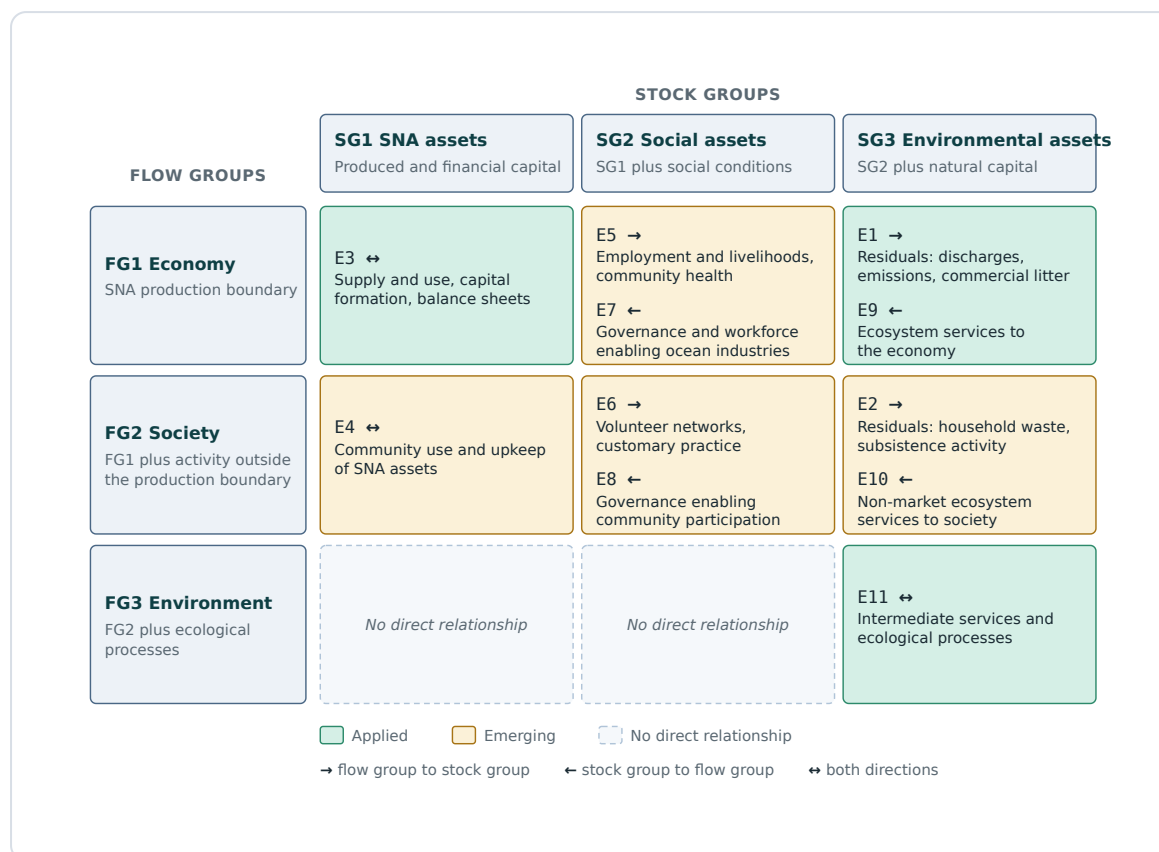


Figure 0.1.3 The eleven accounting relationships (E1-E11) between the flow groups (rows) and the stock groups (columns), shaded by badge. The table below describes each relationship and names its primary circulars.

¶5 The Framework identifies three nested domain groups for flows (FG1-FG3) and three for stocks (SG1-SG3). Figure 0.1.3 illustrates the principal categories of accounting relationship between them; the table below enumerates the eleven specific accounting relationships (E1-E11) addressed by the Technical Guidance.

Domain groups for flows

¶1 The three flow groups are nested like concentric rings:

- ¶2
FG1 – Economy (SNA production boundary): Flows that national accountants already measure: production, income, supply and use, capital formation and financial transactions, and household distributional accounts. For ocean accounts, this encompasses all monetary flows related to ocean industries (fishing, shipping, offshore energy, tourism) as well as physical flows of natural resource inputs and residuals structured through Physical Supply and Use Tables (PSUTs) as defined in SEEA CF Chapters 3 and 4⁵. The 2025 SNA also provides for extended labour accounts, distributional income and consumption accounts, and measures of unpaid household service work (Chapter 16, para 7.31)^{4, 19}, representing the boundary between FG1 and FG2.
- ¶3
FG2 – Society ⊃ FG1: Everything in FG1, plus activities outside the SNA production boundary that are significant for sustainable ocean development: subsistence fishing, volunteer beach clean-ups, community-based marine monitoring, customary marine stewardship practices, and governance activities. The 2025 SNA acknowledges the importance of measuring these extended activities for wellbeing assessment (Chapters 16, 34)^{4, 19}.
- ¶4

FG3 – Environment $\supset$ **FG2**: Everything in FG2, plus ecological processes and interactions within the environment that maintain ecosystem functioning but are not directly used by people. These include intermediate ecosystem services (nutrient cycling, seed dispersal between ecosystems), biogeochemical cycles (carbon, nitrogen, phosphorus), energy flows through food webs, species migrations, and larval dispersal⁶.

Domain groups for stocks

¶1 The stock domain groups follow the same nested structure, mapping directly to the 2025 SNA's multiple-capitals framework (Chapters 34–35)⁴:

• ¶2

SG1 – SNA assets (produced capital): Balance sheets, physical asset inventories, and financial positions within the SNA framework. For ocean accounts, this includes produced assets such as vessels, port infrastructure, aquaculture facilities, and offshore platforms; and financial assets such as fishing licences (where treated as assets) and ocean-related investments.

• ¶3

SG2 – Social assets $\supset$ **SG1**: Everything in SG1, plus community conditions (health, education, food security in coastal populations), governance arrangements (legal frameworks, customary tenure, marine protected area designations), and institutional capacities, corresponding to 'human capital' and 'social capital' in the SNA 2025 framework. Measurement approaches draw on the SEEA EA treatment of cultural services (Chapter 6) and TG-3.7 Governance Accounts⁶.

• ¶4

SG3 – Environmental assets $\supset$ **SG2**: Everything in SG2, plus natural capital: individual environmental assets as defined in the SEEA Central Framework (fish stocks, seabed minerals, water resources) and ecosystem assets as defined in SEEA Ecosystem Accounting (coral reefs, mangroves, seagrass meadows, pelagic ecosystems), measured through extent and condition accounts^{5, 6, 20}.

¶5 Individual environmental assets in the ocean domain can be classified according to the 2025 SNA's five categories of natural resources (para A2.37)^{3, 4}: (1) land, including coastal land and the seabed; (2) mineral and energy resources, including seabed minerals, offshore hydrocarbons, and renewable energy resources such as offshore wind and tidal energy (AN322); (3) biological resources, including aquatic resources such as fish stocks; (4) water resources; and (5) other natural resources. Ecosystem condition is measured using the SEEA EA Ecosystem Condition Typology (ECT), which organises condition variables into three groups and six classes: abiotic characteristics (physical and chemical characteristics), biotic characteristics (compositional state, structural state, and functional state), and landscape/seascape characteristics^{6, 21}. Condition is measured relative to a reference condition reflecting the natural or undegraded state of the ecosystem (SEEA EA para 5.69)⁶.

¶6 An important distinction applies to aquatic biological resources. **Aquaculture production** (cultivated biological resources) falls within the SNA production boundary: the growth of organisms in aquaculture facilities is treated as a process of production, and these resources are classified as produced assets. In contrast, **wild-capture fisheries** target natural biological resources that are outside the production boundary until harvest, and are subject to depletion accounting. This distinction, elaborated in SEEA CF Section 5.9⁵, bears directly on how these resources are recorded in ocean accounts, including whether changes in stock are treated as changes in produced capital or as depletion of natural resources. In practice, changes in aquaculture biomass are recorded as changes in produced assets (gross fixed capital formation or changes in inventories, depending on the holding period), whilst changes in wild fish stocks are recorded as depletion of natural resources in SEEA-aligned supplementary accounts, with direct implications for adjusted measures of net income such as net domestic product (NDP).

Accounting relationships between domain groups

¶1 The eleven accounting relationships in the table below define the connections between flow groups and stock groups. Each relationship represents a distinct category of interaction that is the subject of one or more Technical Guidance Circulars. The “Primary Circular(s)” column identifies where detailed guidance on each relationship can be found.

Edge	Direction	Description	Primary Circular(s)	Badge
E1	FG1 → SG3	Pollution and residuals from economic activity to the environment – industrial discharges, shipping emissions, oil spills, marine litter from commercial sources	TG-3.4	Applied
E2	FG2 → SG3	Pollution and residuals from broader social activity to the environment – household waste, subsistence activity residuals, community-generated marine litter	TG-3.4 , TG-3.5	Emerging
E3	FG1 ↔ SG1	Monetary and physical flows between economic sectors and SNA assets – supply/use tables, capital formation, depreciation, balance sheet changes (bidirectional: monetary flows between SNA sectors and assets run in both directions)	TG-3.1 , TG-3.3	Applied
E4	FG2 ↔ SG1	Social activities affecting or drawing upon SNA assets – community use of public infrastructure, volunteer maintenance of coastal assets	TG-3.5	Emerging
E5	FG1 → SG2	Economic activities contributing to social conditions – employment generating livelihoods, industries affecting community health, economic growth supporting education	TG-3.3 , TG-3.5	Emerging
E6	FG2 → SG2	Social activities contributing to social conditions – volunteer networks building community resilience, customary practices maintaining cultural knowledge	TG-3.5 , TG-3.7	Emerging
E7	SG2 → FG1	Social assets enabling economic flows – governance frameworks that create conditions for investment, educated workforce supporting ocean industries, institutional trust enabling market transactions	TG-3.7 , TG-3.3	Emerging
E8	SG2 → FG2	Social assets enabling social activities – governance arrangements enabling community participation, cultural institutions supporting customary practices	TG-3.5 , TG-3.7	Emerging
E9	SG3 → FG1	Ecosystem services flowing to the economy – fish provisioning, coastal protection enabling economic activity, water purification for industry, seabed minerals extraction	TG-3.2	Applied
E10	SG3 → FG2	Ecosystem services flowing to society beyond the economy – cultural and spiritual values of marine environments, non-market recreational benefits, subsistence provisioning, climate regulation benefits to communities	TG-3.2 , TG-3.5	Emerging

Edge	Direction	Description	Primary Circular(s)	Badge
E11	FG3 ↔ SG3	Intermediate ecosystem services and ecological processes – nutrient cycling maintaining water quality, larval dispersal sustaining fish populations, carbon sequestration maintaining climate regulation capacity (bidirectional: intermediate ecosystem services involve mutual exchanges between ecosystems)	TG-3.2	Applied

¶2 The distinction between E1 and E2 (economic vs. social residuals to the environment) and between E9 and E10 (ecosystem services to the economy vs. to society) reflects a reality that matters for policy: human–environment interactions extend well beyond market transactions. E2 captures residuals from activities outside the SNA production boundary (e.g., household plastic waste, subsistence fishing bycatch), whilst E10 captures ecosystem contributions to wellbeing that are not mediated through market transactions (e.g., cultural values of coral reefs, spiritual significance of marine environments). The social edges E4–E8 represent the least standardised relationships between social capital and both economic and environmental outcomes, drawing on the 2025 SNA's expanded treatment of wellbeing and sustainability measurement ⁴.

Spatial data framework

¶1 The Framework employs a spatially explicit approach with Basic Spatial Units (BSUs) as the foundation. These units may be differentiated into terrestrial, coastal, and marine BSUs, establishing connections between terrestrial activities that impact the ocean, coastal transition zones, and marine environments. Depth layers within BSUs enable a three-dimensional perspective that accommodates the complex spatial nature of ocean systems.

3.6 Relationship to other standards and approaches

¶1 Ocean accounts build on established international standards. Full treatment of the SNA and SEEA concepts relevant to ocean accounts is in [TG-0.2 Overview of Relevant Statistical Standards](#).

System of National Accounts (SNA)

¶1 The **System of National Accounts (SNA)** ³ provides the foundational structure for measuring economic activity. The 2025 SNA formally defines natural capital, treats the depletion of natural resources as a cost of production, and explicitly identifies ocean accounting as an application of its thematic accounting framework (para 35.63) ⁴. It also gives more emphasis to net income measures such as Net Domestic Product (NDP) as the conceptually preferred measure of economic growth (Annex 4, para A4.10) ⁴.

System of Environmental-Economic Accounting (SEEA)

¶1 The **System of Environmental-Economic Accounting (SEEA)** includes two complementary standards: the SEEA Central Framework (SEEA-CF) ⁵ and SEEA Ecosystem Accounting (SEEA-EA) ⁶. Ocean accounts adapt these approaches specifically for the marine domain, addressing challenges such as three-dimensional ecosystem delineation and fluid boundaries ²².

Ocean Economy Satellite Accounts

¶1 **Ocean Economy Satellite Accounts** are specialised economic accounts that disaggregate and measure ocean-related economic activities, providing greater detail on maritime sectors often hidden within broader national account classifications ²³.

Natural Capital Accounting (NCA)

¶1 **Natural Capital Accounting (NCA)** broadly refers to approaches that measure natural assets and their contributions to the economy. Ocean accounts represent a specific application of NCA principles to the marine domain²⁴.

Corporate disclosure frameworks

¶1 **Corporate disclosure frameworks** such as those for climate-related and nature-related financial disclosures focus on enterprise-level reporting. Whilst ocean accounts primarily support public policy, the data can inform corporate reporting on ocean dependencies and impacts²⁵.

Marine Spatial Planning (MSP)

¶1 **Marine Spatial Planning (MSP)** frameworks organise the spatial allocation of ocean activities. Because both MSP and ocean accounts use spatial units, the two approaches are natural complements: MSP defines where activities can happen, and ocean accounts measure what actually happens and what changes as a result²⁶.

3.7 Data quality and uncertainty

¶1 All data have limitations, and acknowledging uncertainty is a mark of rigorous accounting. The SEEA EA identifies six dimensions of data quality relevant to environmental-economic accounting: relevance, timeliness, accuracy, coherence, interpretability, and accessibility, together with the quality of the institutional environment in which the data are compiled (SEEA EA para 2.86)⁶.

¶2 Four categories of uncertainty are particularly pertinent to ocean accounts:

1. ¶3 Uncertainty related to physical measurement of ecosystem services and ecosystem assets
2. ¶4 Uncertainty in the valuation of ecosystem services and ecosystem assets
3. ¶5 Uncertainty related to the dynamics of ecosystems and changes in flows
4. ¶6 Uncertainty regarding future prices and values (SEEA EA para 2.90)⁶

¶7 All accounting work should document the scope of measurement, the definitions applied, the methods used, and the assumptions made (SEEA EA para 2.95). The quality dimensions, uncertainty categories, documentation requirements and quality flags that apply to every account are set out in [TG-0.7 Quality Assurance Principles](#).

3.8 Implementation approaches and starting points

¶1 Countries typically adopt modular approaches, building accounts progressively rather than attempting full implementation from the outset. Common entry points include:

- ¶2 **Thematic focus:** Start with a pressing policy question: marine protected area management, sustainable fisheries, coastal tourism, marine pollution reduction, climate change adaptation, or blue economy strategy monitoring²⁷.
- ¶3 **Geographic scope:** Start with the area that matters most: the national level (whole exclusive economic zone), subnational regions, specific ecosystems (coral reefs, mangroves), marine protected areas, or areas of high economic significance or environmental vulnerability.
- ¶4 **Existing data availability:** Start with what you already have: national statistical compilations, environmental monitoring programmes, economic surveys, marine spatial data infrastructures, research programmes, and administrative datasets²⁸.
- ¶5 **Institutional arrangements:** Start with the institutions ready to collaborate: national statistics office-led, environment agency-led, multi-agency collaborative, or research institution partnerships.

¶6 Initial pilot studies often focus on feasibility assessment and capability development before scaling to wider implementation. Countries with limited resources may begin with rapid assessments using global datasets before developing more detailed national accounts²⁹.

4. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

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Overview of Relevant Statistical Standards

Provides a reference overview of the international statistical standards that underpin Ocean Accounts: the System of National Accounts 2025 (SNA 2025).

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OUTCOME

This Circular provides a reference overview of the international statistical standards that underpin Ocean Accounts: the *System of National Accounts 2025* (SNA 2025), the *System of Environmental-Economic Accounting Central Framework* (SEEA CF), and *SEEA Ecosystem Accounting* (SEEA EA). It also covers the classification systems required for consistent and comparable ocean accounts. For the conceptual framework and key components of Ocean Accounts, see [TG-0.1 General Introduction to Ocean Accounts](#). Key terms are defined in [TG-0.6 Glossary](#).

CONTENTS

1. Outcome 3

2. Requirements 3

3. Guidance Material 3

 3.1 System of National Accounts 2025 4

 3.2 SEEA Central Framework 6

 3.3 SEEA Ecosystem Accounting 7

 3.4 SEEA-Oceans (Emerging) 9

 3.5 Related Classification Standards 10

 3.6 Standards Application Summary 12

4. Acknowledgements 13

5. References 14

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DRAFT

1. Outcome

¶1 This Circular provides a reference overview of the international statistical standards that underpin Ocean Accounts: the *System of National Accounts 2025* (SNA 2025), the *System of Environmental-Economic Accounting Central Framework* (SEEA CF), and *SEEA Ecosystem Accounting* (SEEA EA). It also covers the classification systems required for consistent and comparable ocean accounts. For the conceptual framework and key components of Ocean Accounts, see **TG-0.1 General Introduction to Ocean Accounts**. Key terms are defined in **TG-0.6 Glossary**.

2. Requirements

¶1 This Circular requires familiarity with:

- ¶2 **TG-0.1 General Introduction to Ocean Accounts** – for the conceptual framework and key components of Ocean Accounts, including the relationship between environmental and economic accounting frameworks and the spatial boundaries relevant to ocean accounting.

3. Guidance Material

¶1 The SNA provides the overarching framework for economic accounting. The SEEA extends this framework to measure interactions between the economy and the environment. Within the SEEA family, the Central Framework addresses individual environmental assets and physical flows, whilst SEEA Ecosystem Accounting measures ecosystems as integrated spatial units¹. Ocean Accounts build upon all three, adapting their concepts and methods to the marine and coastal domain.

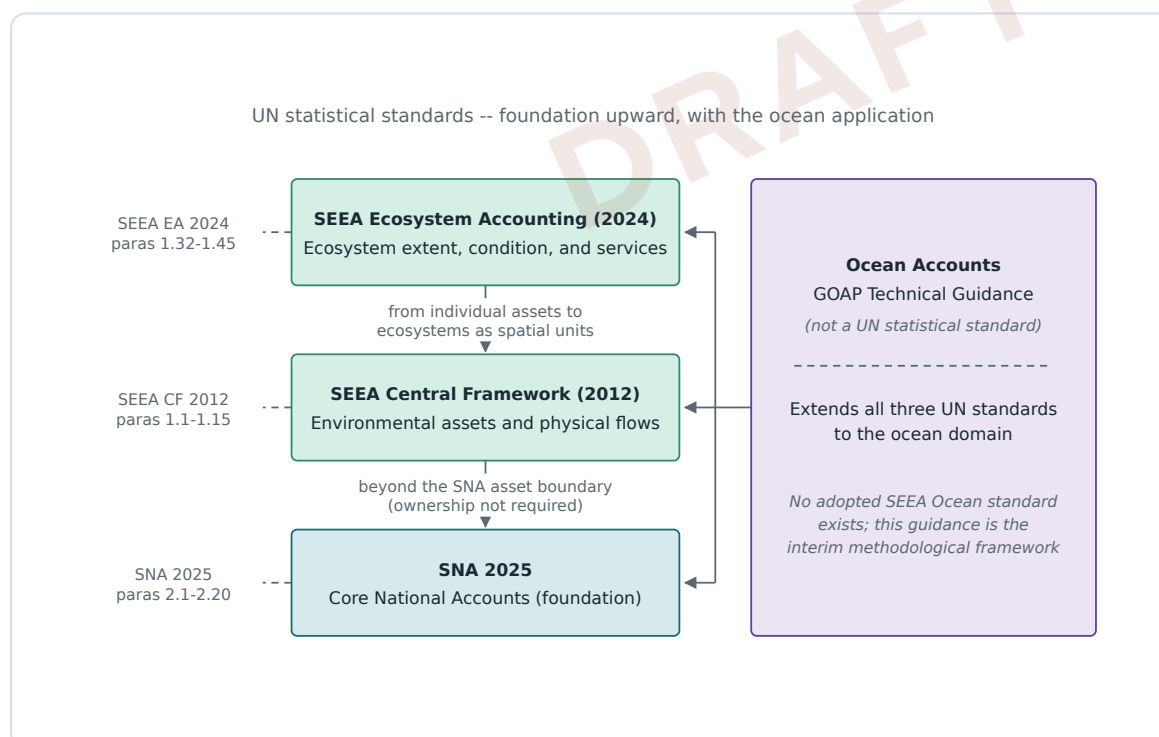


Figure 0.2.1 SNA 2025 underpins SEEA CF and SEEA EA; Ocean Accounts extends all three to the marine domain and is not itself a UN statistical standard.

Source: SNA 2025 paras 2.1-2.20 (sequence of economic accounts); SEEA CF 2012 paras 1.1-1.15 (scope and purpose); SEEA EA 2024 paras 1.32-1.45 (relationship to SNA and SEEA CF).

3.1 System of National Accounts 2025

¶1 The **System of National Accounts (SNA)** is the internationally agreed set of standards for measuring economic activity. It provides the conceptual framework, classifications, and accounting rules that countries use to compile their national accounts statistics. The 2025 SNA, adopted by the United Nations Statistical Commission at its 56th session in March 2025, strengthens linkages with environmental accounting and introduces new concepts directly relevant to ocean accounts².

¶2 The SNA defines a “whole set of standards, including extended/thematic accounts and supplementary items”³. Its integrated framework consists of the sequence of economic accounts, supply and use tables, and balance sheets³. The 2025 SNA refers to thematic and extended accounts (replacing the earlier “satellite account” terminology used in SNA 2008) to better reflect the integrated nature of these compilations.

Key concepts for ocean accounting

¶1 The **sequence of economic accounts** records production of goods and services, generation, distribution and redistribution of income, and capital accumulation, culminating in balance sheets showing stocks of assets and liabilities⁴. For the ocean economy, this sequence enables measurement of gross value added by ocean industries, income flows to households in ocean sectors, government expenditure on fisheries management, and investment in ocean infrastructure. Application to ocean economy thematic accounts is in **TG-3.3 Economic Activity Relevant to the Ocean**.

Treatment of natural resources

¶1 The 2025 SNA explicitly recognises natural resources as a separate asset category, including renewable energy resources⁵. It identifies five categories: land, mineral and energy resources, biological resources, water resources, and other natural resources². For ocean accounting, this encompasses seabed minerals, offshore energy resources (including offshore wind and tidal energy), aquatic biological resources such as fish stocks, and coastal land.

¶2 The 2025 SNA introduces **natural capital**, defined as “the combination of natural resources and ecosystem assets”⁶. This definition bridges the SNA’s treatment of individual natural resources with the ecosystem approach in SEEA Ecosystem Accounting. Asset accounting applying this concept is in **TG-3.1 Asset Accounts**.

Depletion as a cost of production

¶1 The 2025 SNA treats depletion of natural resources as a cost of production⁷. When fish stocks are harvested beyond sustainable levels, the resulting depletion is recorded as a cost reducing net measures of production. The SNA now emphasises that “the volume change of net domestic product (NDP) is identified as the conceptually preferred measure of economic growth, not replacing but to be used alongside the volume change of gross domestic product (GDP)”⁷.

¶2 ⓘ Concrete application

¶3 When compiling structural indicators for the ocean economy (**TG-2.5 Structure and Function of the Ocean Economy**), analysts calculate **Net Ocean GVA** by subtracting depletion of marine natural resources from Gross Ocean GVA. If a coastal state reports Gross Ocean GVA of USD 1,750 million but fish stock depletion of USD 35 million and offshore mineral depletion of USD 60 million, Net Ocean GVA is USD 1,655 million.

¶4 The depletion share is calculated as total depletion divided by Gross Ocean GVA:

$$\text{Depletion share (\%)} = (\sum \text{depletion items} / \text{Gross Ocean GVA}) \times 100 = (35 + 60) / 1,750 \times 100 = 5.4\%$$

¶5 Gross Ocean GVA is used as the denominator because it represents the economy’s recorded contribution before adjusting for natural capital drawdown, making it the conventional basis for sustainability indicators of this type.

¶6 **When depletion data are unavailable:** Many countries, particularly small island developing states, lack the official sustainable yield estimates required to calculate fish stock depletion. Compilers should apply the following tiered approach:

- ¶7 **Tier 1** – Where depletion data for all major marine natural resources exist, report both Gross Ocean GVA and Net Ocean GVA.
- ¶8 **Tier 2** – Where depletion data exist for some resources only, report Gross Ocean GVA with a qualitative note identifying the resources for which depletion could not be calculated and estimating the likely direction of bias.
- ¶9 **Tier 3** – Where no depletion data are available, report Gross Ocean GVA only, flag depletion data as a priority data gap, and cross-reference **TG-0.7 Quality Assurance** for data gap documentation guidance.

¶10 In all tiers, the metadata should document which depletion components are included, which are absent, and the data source used for any estimates.

Production boundary and natural processes

¶1 The SNA establishes clear criteria for what constitutes economic production. A necessary condition is that the activity “must be carried out under the instigation, control and responsibility of some institutional unit that exercises ownership rights over whatever is produced”⁸. This general condition (para 1.65) is applied in SNA 2025 para 13.20 to conclude that the natural growth of wild fish stocks under quota management is not production, because the institutional unit does not exercise direct control over the biological growth process: “the natural growth of non-cultivated biological resources, such as fish stocks under a quota regime, may take the form of fish becoming more numerous. Although these resources are economic assets, growth of this kind is not under the direct control, responsibility and management of an institutional unit and thus is not treated as production”⁹. This is not a special carve-out but a consistent application of the general production boundary rule: quota management establishes an entitlement to harvest but not direct control over the biological growth process.

¶2 Aquaculture production is included in ocean economy gross value added (ISIC Division 03) reported in **TG-3.3**. Natural growth of wild fish stocks is recorded as an addition to stock in the physical asset account in **TG-3.1** Table 7.

Asset boundary

¶1 Natural resources are included in the SNA’s balance sheets “provided that institutional units are exercising effective ownership rights over them, that is, are actually in a position to be able to benefit from them”¹⁰. Resources within a country’s Exclusive Economic Zone (EEZ) are generally within scope. High seas resources “over which no ownership rights can be exercised” are excluded¹⁰. The SNA explicitly recommends compilation of ecosystem accounts according to SEEA Ecosystem Accounting¹¹.

¶2 For resources in areas beyond national jurisdiction (ABNJ), the Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ Agreement), which entered into force on 17 January 2026, may provide new frameworks for accounting treatment as its governance structures develop¹². The BBNJ Agreement establishes new institutional arrangements for marine genetic resources, area-based management tools, environmental impact assessments, and capacity-building in ABNJ, which may clarify the institutional attribution of benefits from high seas resources and inform asset accounting boundaries. Guidance on deep-sea and ABNJ accounting is in **TG-6.6 Deep-Sea and ABNJ**.

Linkage with SEEA

¶1 Ecosystem services, the contributions of marine and coastal ecosystems to human welfare, largely remain outside the SNA production boundary: the natural growth of wild fish stocks, coastal protection by mangroves, and carbon sequestration by seagrass are not recorded as production unless directly transacted in markets¹³. SEEA Ecosystem Accounting addresses this gap directly: it “complements the estimates of output based on the SNA production boundary” by measuring ecosystem services in both physical and monetary terms¹⁴.

¶2 The 2025 SNA “strengthens the linkages with the System of Environmental Economic Accounting (SEEA)”⁵, describes the SEEA as providing “a comprehensive set of monetary and non-monetary accounts covering natural resources and ecosystem assets”¹⁵, and “strongly encourages” compilation of ecosystem accounts according to SEEA Ecosystem Accounting¹¹. The 2025 SNA also explicitly identifies ocean accounting as an application of its thematic accounting framework².

¶3 The SNA’s thematic accounting framework (SNA 2025 Chapter 38)¹⁶ provides the methodological basis for compiling ocean economy accounts as a cross-cutting segment of the national economy, following SNA 2025 guidance on identifying ocean-characteristic industries and products and extracting these from national supply and use tables while maintaining accounting identities. Application is in **TG-3.3** Section 3.4.

3.2 SEEA Central Framework

¶1 The **SEEA Central Framework** (SEEA CF) is “a multipurpose conceptual framework that describes the interactions between the economy and the environment, and the stocks and changes in stocks of environmental assets”¹⁷. Adopted as an international statistical standard in 2012, the SEEA CF extends the SNA’s economic accounts to systematically record physical flows between the environment and the economy and to measure stocks of individual environmental assets. An update is currently underway, with adoption anticipated in March 2028, to ensure alignment with SNA 2025¹⁸.

Environmental assets

¶1 The SEEA CF defines **environmental assets** as “the naturally occurring living and non-living components of the Earth, together constituting the biophysical environment, that may provide benefits to humanity”¹⁹. These assets are classified into seven main categories: mineral and energy resources; land; soil resources; timber resources; **aquatic resources** (including wild fish and aquaculture); other biological resources; and water resources²⁰. For ocean accounting, the aquatic resources category is most important, encompassing both cultivated aquatic resources (aquaculture) and natural aquatic resources (wild fish, crustaceans, molluscs, and aquatic plants)²¹.

¶2 The SEEA CF scope includes “all natural resources, cultivated biological resources and land within a country of reference (including resources within a country’s exclusive economic zone)”²². For high seas resources, scope is more limited: “While some aquatic resources on the high seas are included as part of individual environmental assets (e.g., fish stocks attributable to countries on the basis of international agreements on access rights), the overall scope of the asset boundary in the SEEA Central Framework is narrower”²³.

Physical flow accounts

¶1 The SEEA CF Physical Supply and Use Tables (PSUTs) record flows between the environment and the economy in physical units (tonnes, cubic metres, joules)²⁴. For ocean accounting, these enable measurement of fish catches and other aquatic harvests; extraction of seabed minerals and energy resources; use of marine water; and inputs of marine renewable energy. The SEEA CF also provides frameworks for recording residual flows—emissions and waste returned to the environment—which are needed for understanding pressures on marine ecosystems from pollution. Detailed guidance is in **TG-3.2 Flows from Environment to Economy**.

Asset accounts structure

¶1 Asset accounts in the SEEA CF record the opening stock of an environmental asset, additions and reductions during the period, and the closing stock²⁵. For aquatic resources, additions include natural growth (recruitment and biomass increase), whilst reductions include catches, natural mortality, and catastrophic losses. The SEEA CF defines **physical depletion** as “the decrease in the quantity of the stock of a natural resource over an accounting period that is due to the extraction of the natural resource by economic units occurring at a level greater than that of regeneration”²⁶. Depletion is a function of the net change in stock: it arises when extraction exceeds regeneration, causing the stock to decline. A simplified comparison of catch against a sustainable yield estimate is insufficient, because the SEEA CF anchors depletion to the actual net stock change rather than to any single yield reference point. The full derivation is: depletion = gross catch – (natural growth – natural mortality – catastrophic losses – net stock change), consistent with SEEA CF para 5.75–5.83. For sourcing sustainable yield conventions and stock assessment data, see **TG-6.7 Fisheries Stock Assessment** (planned circular)²⁷.

¶2 The treatment of discards is addressed at SEEA CF para 2.90: “During the extraction of some natural resource inputs, not all extraction is retained in the economy, for example, in fishing operations, there is an amount of discarded catch.”²⁸ Detailed methodological guidance is in **TG-3.1 Asset Accounts** and **TG-3.2 Flows from Environment to Economy**.

¶3 Following SEEA CF Table 5.1, stock reappraisals are recorded as “revisions and reclassifications,” a distinct account row from “discoveries” (genuine identification of previously unknown resource occurrences). Conflating the two produces errors in the policy-relevant depletion measure. See SEEA CF para 5.55–5.57 for the full distinction²⁹.

Aquaculture versus wild capture

¶1 The SEEA CF maintains a clear distinction between cultivated and natural biological resources. “All cultivated biological resources are considered to be within the production boundary”³⁰, meaning aquaculture production is treated similarly to agricultural production. Natural biological resources (including wild fish) “are recorded as entering the economy at the point of harvest”³¹. Changes in aquaculture stocks are recorded as changes in produced assets. Reductions in wild fish stocks through overfishing constitute depletion of natural resources. The physical asset account template in **TG-3.1** Table 1a sets out cultivated and natural aquatic resources in separate columns.

Limitations for marine ecosystems

¶1 The SEEA CF does not treat the ocean itself as an environmental asset: it “does not include oceans and the atmosphere as part of environmental assets, since their stocks are too large to be meaningful for analytical purposes”²³. Marine ecosystems as integrated spatial units are outside the SEEA CF scope. SEEA Ecosystem Accounting is required for these.

3.3 SEEA Ecosystem Accounting

¶1 **SEEA Ecosystem Accounting** (SEEA EA) was adopted by the United Nations Statistical Commission in March 2021 “as an international statistical standard for the ecosystem accounting framework and physical ecosystem accounts, and presents internationally recognized statistical principles and recommendations for the valuation of ecosystem services and assets”³². The SEEA EA extends the SEEA CF by treating ecosystems as integrated spatial units—**ecosystem assets**—that can be measured in terms of their extent, condition, and the services they provide.

Core concepts

¶1 The SEEA EA defines an **ecosystem** as “a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit”³³. An **ecosystem asset** is “contiguous spaces of a specific ecosystem type characterized by a distinct set of biotic

and abiotic components and their interactions”³⁴, assigned to an **ecosystem type** that “reflects a distinct set of abiotic and biotic components and their interactions”³⁵.

¶2 **Ecosystem services** are “the contributions of ecosystems to the benefits that are used in economic and other human activity”³⁶, representing flows generated by ecosystems. The SEEA EA distinguishes between final ecosystem services (directly used by economic units or households) and intermediate services (inputs to the supply of other ecosystem services)³⁷.

Five types of ecosystem account

¶1 The SEEA EA describes five types of ecosystem account³⁸:

Account type	What it records	What it tells you
Ecosystem extent accounts	Areas of different ecosystem types and changes over time.	Whether you are gaining or losing mangroves, seagrass, or reef area.
Ecosystem condition accounts	Quality of ecosystem assets through condition variables and indicators.	Whether your remaining ecosystems are healthy or degrading.
Ecosystem services flow accounts (physical)	Supply and use of ecosystem services in physical units.	How much coastal protection, carbon sequestration, or fish nursery service your ecosystems provide.
Ecosystem services flow accounts (monetary)	Value of ecosystem services in currency units.	The economic contribution of ecosystem services.
Monetary ecosystem asset accounts	Value of ecosystem assets as natural capital.	The total capital value of your marine ecosystems.

¶2 The Statistical Commission noted “outstanding methodological concerns related to chapters 8 to 11 on valuation”³⁹. Accordingly, whilst the physical ecosystem accounts (chapters 3–7) were adopted as a full international statistical standard, the valuation chapters (8–11) were adopted at the level of “internationally recognized statistical principles and recommendations”³². This distinction is relevant for ocean accounting applications involving monetary valuation of marine ecosystem services and assets. A worked example applying all five account types to coastal mangroves and seagrass is in **TG-3.1 Asset Accounts** Section 3.7.

Marine ecosystem considerations

¶1 The SEEA EA notes that “marine ecosystems are not concentrated near one surface (i.e. the air-land/water interface) but extend throughout the water column and include the underlying sediment and seabed”⁴⁰. The recommended delineation approach is: “for marine ecosystems within the continental shelf, it is recommended that ecosystem assets be delineated based on the areas of the different ecosystem types associated with the seabed, for example, seagrass meadows, subtidal sandy bottoms and coral reefs”⁴⁰.

¶2 The spatial boundary for ecosystem accounting aligns with the SEEA CF: “Consistent with the scope of the SEEA Central Framework, the scope of national jurisdictions for ecosystem accounting should include all ecosystems across the terrestrial, freshwater and marine realms to the boundary of the exclusive economic zone (EEZ)”⁴¹. For areas beyond national jurisdiction, the SEEA EA notes these may be “the focus of regional or international accounting work”⁴².

IUCN Global Ecosystem Typology

¶1 The SEEA EA adopts the **IUCN Global Ecosystem Typology (GET)** as its reference classification for ecosystem types⁴³. Detailed marine biome and ecosystem functional group classifications relevant to ocean accounting are described in Section 3.5 below.

Ecosystem condition measurement

¶1 Ecosystem condition is measured using a three-stage approach: presentation of condition variables, derivation of condition indicators, and optional derivation of composite indices⁴⁴. The SEEA EA links condition to **ecosystem integrity**: “the ecosystem’s capacity to maintain its characteristic composition, structure, functioning and self-organization over time within a natural range of variability”⁴⁵. For marine ecosystems, key drivers of condition include bathymetric profile, climate factors (including ocean acidification and temperature), substrate type, ocean circulation, salinity, and human activities⁴⁶.

¶2 Condition variables are selected from SEEA EA Table 5.7, which organises variables by characteristic class using full descriptive names (e.g., coral cover, bleaching prevalence, calcification rate, fish species richness, rugosity). See **TG-6.1 Coral Reef Accounts** for detailed guidance on condition variable selection for coral reef ecosystem assets⁴⁴.

Monetary ecosystem asset accounts and discount rate guidance

¶1 Monetary ecosystem asset accounts record the value of ecosystem assets as natural capital, derived by capitalising projected ecosystem service flows using a discount rate (SEEA EA Chapter 9)³⁸. The discount rate is one of the most consequential inputs in ecosystem asset valuation. SEEA EA para 10.36–10.42 discusses appropriate approaches, including:

- ¶2 The **social discount rate**, which reflects societal time preference and intergenerational equity considerations;
- ¶3 The **risk-free rate** as a lower bound, typically approximated by long-term sovereign bond yields;
- ¶4 Country-specific approaches where market data are available.

¶5 Any worked example applying a specific discount rate (such as the illustrative 4% in **TG-3.1** Table 8) is illustrative only and does not constitute a GOAP recommendation. Compilers should select a rate appropriate to their national context following SEEA EA para 10.36–10.42. For countries without a sovereign yield curve, the SEEA EA recommends consulting regional comparators or applying a conservative social discount rate consistent with national planning frameworks. Full valuation methodology is in **TG-3.1 Asset Accounts**.

¶6 The closing value of a monetary ecosystem asset account is derived by summing all account entries: opening value, additions (natural expansion or restoration, upward revaluations), and subtractions (degradation, conversions, downward revaluations). Every account entry must correspond to a distinct row in the SEEA EA para 9.10 account structure and reconcile arithmetically to the stated closing value.

3.4 SEEA-Oceans (Emerging)

¶1 Standards status of content in this section

¶2 Content in this circular draws on sources with different levels of international endorsement. Compilers should distinguish:

1. ¶3 **Adopted international statistical standards** – SNA 2025 (adopted March 2025), SEEA CF (adopted 2012, update anticipated March 2028), and SEEA EA physical accounts (Chapters 3–7, adopted March 2021). These carry full UN Statistical Commission authority.
2. ¶4 **Internationally recognised statistical principles and recommendations** – SEEA EA valuation chapters (Chapters 8–11, adopted at principles level March 2021). These are authoritative guidance but carry a different level of endorsement than the physical accounts. As the SEEA EA Preface para 8 notes, the Commission “noted that there are outstanding methodological concerns related to chapters 8 to 11 on valuation” and adopted these chapters as principles-level guidance.³⁹
3. ¶5 **Emerging / non-adopted frameworks** – SEEA-Oceans (no formal Statistical Commission adoption), GOAP Technical Guidance (interim methodological framework). These apply princi-

ples from adopted standards to the ocean domain but do not themselves carry Statistical Commission authority.

¶6 When citing material from this circular in policy or official statistical publications, authors should identify which tier of authority applies to the specific methodology being cited.

¶7 The SEEA EA does not describe a separate “SEEA-Oceans” standard; rather, it describes **ocean accounts** as a thematic accounting application that builds upon SEEA EA and the SEEA Central Framework⁴⁷. No ocean-specific thematic guidance under the SEEA has yet been adopted by the United Nations Statistical Commission. The GOAP Technical Guidance provides an interim methodological framework applying the principles of SNA 2025, SEEA CF, and SEEA EA to the marine and coastal domain. As the international statistical community continues to develop ocean-specific methodology, this Technical Guidance will be updated to reflect any standards adopted by the Statistical Commission.

Ocean accounts framework

¶1 The SEEA EA describes ocean accounts as providing “a broad framework for connecting relevant elements of the SNA, the SEEA Central Framework and SEEA EA in order to harmonize priority ocean data covering economic, ecological, governance and social dimensions”⁴⁷. The framework adds governance, management and technology accounts alongside the environmental and economic accounts derived from SEEA⁴⁸.

¶2 Ocean accounts enable measurement of⁴⁹:

- ¶3 Changes in ocean ecosystem extent and condition and in associated flows of ecosystem services
- ¶4 Changes in ocean wealth, including produced assets (e.g., ports) and non-produced assets (e.g., mangroves, coral reefs)
- ¶5 Ocean-related income and welfare for different groups of people
- ¶6 Ocean-based economic production (GDP from ocean-related sectors)
- ¶7 Changes in how oceans are governed and managed

Current status and development

¶1 The Global Ocean Accounts Partnership (GOAP), endorsed as a key initiative in the UN Ocean Decade Programme in July 2025, coordinates the development of ocean accounting methodology and supports implementation in member countries¹⁸. As of 2025, more than 33 countries are undertaking ocean accounting initiatives, among them the Netherlands, which has moved to a first full SEEA ecosystem account for its North Sea waters⁵⁰. At the Third United Nations Conference to Support the Implementation of Sustainable Development Goal 14 (UNOC3) in Nice in June 2025, the political declaration “Our ocean, our future: united for urgent action” formally recognized ocean accounting as a key mechanism to accelerate action for a sustainable ocean economy⁵¹.

Challenges for ocean accounting

¶1 The SEEA EA acknowledges specific challenges for ocean accounting. Data on the ocean “is more fragmented than data for terrestrial and freshwater ecosystems and the understanding of the ecological and economic connections among marine ecosystems, coastal ecosystems and other ecosystems is less advanced, although the relationship is expected to be highly non-linear”⁵². Additional challenges include appropriately reflecting the three dimensions of marine areas (depth in addition to area), accurately capturing changes in condition, and addressing transboundary issues for migrating fish stocks and shared ecosystems⁵³.

3.5 Related Classification Standards

¶1 The key classifications for ocean accounting span economic activities, products, government expenditure, environmental protection activities, and ecosystem types.

International Standard Industrial Classification (ISIC)

¶1 The **International Standard Industrial Classification of All Economic Activities (ISIC)** classifies economic activities⁵⁴. ISIC Revision 5 was endorsed by the UN Statistical Commission at its 55th session in March 2024 and organises activities into a four-level hierarchy: sections (alpha-betic), divisions (2-digit), groups (3-digit), and classes (4-digit)⁵⁵. Where national classifications have not yet adopted ISIC Rev.5, compilers should use the correspondence tables between ISIC Rev.4 and ISIC Rev.5 published by the UN Statistics Division and document the classification version applied in their metadata⁵⁶.

¶2 For ocean accounting, the most directly relevant ISIC categories are:

ISIC category	Coverage
Division 03 – Fishing and Aquaculture	Marine fishing, freshwater fishing, marine aquaculture, and freshwater aquaculture. ⁵⁷
Division 50 – Water Transport	Sea and coastal passenger transport, sea and coastal freight transport, and inland water transport. ⁵⁸
Class 5222 – Service activities incidental to water transportation	Port operations, navigation, pilotage, and lighthouse activities. ⁵⁹

¶3 Other ocean-relevant categories include shipbuilding, offshore support activities for petroleum and natural gas extraction, and recreational fishing services⁶⁰. Fish processing at land-based plants is classified in Division 10 (Food products)⁶¹.

Central Product Classification (CPC)

¶1 The **Central Product Classification (CPC)** classifies goods and services⁶². CPC Version 3.0 was endorsed by the UN Statistical Commission at its 55th session in March 2024⁶³. Each CPC subclass corresponds to specific ISIC classes of industrial origin, enabling linkage between product statistics and industry statistics⁶⁴.

¶2 Division 04 (Fish and Other Fishing Products) provides detailed categories for live fish, fresh fish, crustaceans, molluscs, and other aquatic products, with distinctions between wild-caught and farmed products⁶⁵. Division 21 covers processed fish products. Transport services related to water are classified in Divisions 65 (water transport services) and 67 (port and waterway operation services)⁶⁶.

Classification of Functions of Government (COFOG)

¶1 The **Classification of Functions of Government (COFOG)** classifies government expenditure by purpose⁶⁷. COFOG is currently under revision, with adoption expected in March 2028⁶⁸. For ocean accounting, the relevant COFOG categories are:

COFOG category	Coverage
04.2.3 – Fishing and hunting	Fisheries management, regulation, licensing, and support for commercial fishing activities. ⁶⁹
04.5.2 – Water transport	Maritime transport infrastructure and operations. ⁷⁰
Division 05 – Environmental protection	Sub-categories applicable to marine environmental protection, including pollution abatement and biodiversity protection. ⁷¹

¶2 **Interim guidance pending the March 2028 COFOG revision:** Compilers preparing pilot ocean accounts before the revised COFOG is adopted should apply the existing COFOG (2000 version) codes with supplementary national detail and document allocation decisions in metadata. Where

existing codes do not clearly distinguish ocean-related expenditures (for example, marine spatial planning or blue economy development expenditures not fitting clearly within Class 04.2.3), compilers should record a supplementary classification note alongside the COFOG code. Compilers should monitor the UNSD COFOG revision process at

<https://unstats.un.org/unsd/classifications/cofog/revision>

(<https://unstats.un.org/unsd/classifications/cofog/revision>) and consult **TG-1.1 National Ocean Budgets** for interim bridging conventions on government expenditure classification.

CEPA and CReMA

¶1 The **Classification of Environmental Protection Activities (CEPA)** and **Classification of Resource Management Activities (CReMA)** provide detailed categories for environmental expenditure and activities⁷². Developed jointly by Eurostat and UNSD, these are international classifications with global applicability⁷³. SEEA CF Chapter 4 provides the overarching framework context. Compilers should note that CEPA and CReMA are in the process of being replaced by the new **Classification of Environmental Purposes (CEP)**, which is progressing through UN adoption. Compilers implementing ocean accounts should monitor CEP development at the UNSD classifications portal⁷⁴.

¶2 For ocean accounting, relevant CEPA categories include wastewater management (CEPA 2) covering discharge to marine waters⁷⁵; protection and remediation of soil and water (CEPA 4) which “concerns surface water, groundwater and marine waters” including oil spill cleanup in coastal areas⁷⁶; and protection of biodiversity and landscapes (CEPA 6) covering marine species and habitat protection, marine protected area management, and fisheries quota enforcement⁷⁷. CReMA 13A covers production of energy from renewable sources including ocean energy (wave, tidal, thermal)⁷⁸.

IUCN Global Ecosystem Typology

¶2 The **IUCN Global Ecosystem Typology (GET)** serves as the reference classification for ecosystem types in SEEA Ecosystem Accounting. For ocean accounting, the GET provides a typology of marine and coastal ecosystems organised into realms, biomes, and ecosystem functional groups. The Marine realm encompasses 20 ecosystem functional groups across four biomes, from seagrass meadows and coral reefs in the Marine Shelf biome to chemosynthetic-based ecosystems in the Deep Sea Floors biome⁷⁹. The transitional realms add further categories for shoreline systems, coastal wetlands, mangroves, estuaries, and other coastal ecosystem types⁸⁰.

Cross-classification considerations

¶1 ISIC identifies ocean-related industries (producers), CPC identifies ocean-related products (outputs), COFOG tracks government spending on ocean functions, CEPA/CReMA tracks environmental protection and resource management activities, and IUCN GET provides the ecosystem asset classification. Correspondences between classifications—such as the linkage between CPC subclasses and their ISIC classes of origin—facilitate integrated analysis⁸¹. Gaps exist: ISIC does not separately identify marine mining from land-based mining, offshore renewable energy is not distinctly classified, and marine-specific environmental activities are often combined with terrestrial activities in CEPA and CReMA⁸². These limitations may require supplementary classification detail for complete ocean accounts.

3.6 Standards Application Summary

¶1 Table 3.1 summarises how the international statistical standards described in this Circular are applied across the GOAP Technical Guidance, mapping each standard to the key concepts it provides, the ocean accounting applications it enables, and the specific circulars where detailed implementation guidance is provided.

¶2 *Table 3.1: Application of statistical standards in ocean accounts*

Standard	Key concepts for ocean accounts	Primary applications	Implementing circulars
SNA 2025	Integrated framework of national accounts; sequence of economic accounts; thematic accounts; natural capital; depletion as cost of production; asset boundary (EEZ scope)	Ocean economy GDP, employment, trade statistics; net ocean GVA adjusted for depletion; ocean-related government expenditure; investment in ocean infrastructure	TG-3.3 Economic Activity TG-2.5 Ocean Economy Structure TG-1.1 National Ocean Budgets
SEEA CF	Environmental assets; physical supply and use tables; natural inputs; physical depletion; asset accounts for aquatic resources, minerals, energy; gross catch vs. landings; cultivated vs. natural resources	Fish stock asset accounts; physical flow accounts for marine resources; depletion measurement; valuation of marine natural resources	TG-3.1 Asset Accounts TG-3.2 Flows from Environment to Economy TG-6.7 Fisheries Stock Assessment (planned)
SEEA EA	Ecosystem assets; ecosystem extent, condition, services; five types of ecosystem account; IUCN GET classification; ecosystem integrity; degradation; NPV of ecosystem services	Coral reef, mangrove, seagrass ecosystem accounts; marine ecosystem condition monitoring; coastal protection and carbon sequestration services; blue carbon accounting	TG-3.1 Section 3.5 Ecosystem Assets TG-6.1 Coral Reef Accounts TG-6.2 Mangrove Accounts TG-6.3 Seagrass Accounts
ISIC Rev.5	Industry classification hierarchy; Division 03 Fishing and aquaculture; Division 50 Water transport; offshore energy extraction	Ocean economy sector composition; employment by ocean industry; output and GVA by industry; international comparison	TG-3.3 Section 3.3 Industry Classification TG-2.5 Sector Composition
CPC Ver.3.0	Product classification hierarchy; Division 04 Fish products; Division 65 Water transport services; ocean-characteristic products	Ocean economy supply and use tables; exports and imports of ocean products; tourism receipts; fish trade statistics	TG-3.3 Section 3.4 Product Classification TG-2.5 Trade Indicators
IUCN GET	Ecosystem type classification; Marine realm (M1-M4); Transitional realms (MT, MFT); Ecosystem functional groups (M1.3 Coral reefs, MFT1.2 Mangroves, M1.1 Seagrass)	Ecosystem extent accounts; ecosystem condition variable selection; spatial units for ecosystem accounting; ecosystem asset delineation	TG-3.1 Sections 3.5.1-3.5.2 TG-6.1 Coral Reef Accounts TG-6.2 Mangrove Accounts

4. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

5. References

1. ¶1 See SEEA EA para 1.45 and SNA 2025, Preface para B for the hierarchical relationship among these standards.
2. ¶2 United Nations et al. (2025). *System of National Accounts 2025*. New York: United Nations. ST/ESA/STAT/SER.F/2/Rev.6.
3. ¶3 United Nations et al. (2025). *System of National Accounts 2025*, Preface para B.
4. ¶4 United Nations et al. (2025). *System of National Accounts 2025*, Chapter 3, para 3.1-3.15.
5. ¶5 United Nations et al. (2025). *System of National Accounts 2025*, Preface, Wellbeing and sustainability section.
6. ¶6 United Nations et al. (2025). *System of National Accounts 2025*, Chapter 35, para 35.24; see also Glossary.
7. ¶7 United Nations et al. (2025). *System of National Accounts 2025*, Preface, Wellbeing and sustainability section; Annex 4, para A4.59.
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1. ¶21 United Nations et al. (2014). *SEEA Central Framework*, Section 5.9.
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4. ¶24 United Nations et al. (2014). *SEEA Central Framework*, Preface, para B.18.
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6. ¶26 United Nations et al. (2014). *SEEA Central Framework*, Chapter 5, para 5.75.
7. ¶27 TG-6.7 Fisheries Stock Assessment is a planned circular; methodology for sourcing sustainable yield estimates and stock assessment data will be addressed therein.
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3. ¶33 United Nations (2024). *SEEA Ecosystem Accounting*, para 2.6 (citing the Convention on Biological Diversity).
4. ¶34 United Nations (2024). *SEEA Ecosystem Accounting*, para 3.5.
5. ¶35 United Nations (2024). *SEEA Ecosystem Accounting*, para 3.6.
6. ¶36 United Nations (2024). *SEEA Ecosystem Accounting*, para 2.24.
7. ¶37 United Nations (2024). *SEEA Ecosystem Accounting*, para 6.15.
8. ¶38 United Nations (2024). *SEEA Ecosystem Accounting*, para 1.31.
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2. ¶42 United Nations (2024). *SEEA Ecosystem Accounting*, para 3.26d.
3. ¶43 United Nations (2024). *SEEA Ecosystem Accounting*, para 3.57–3.66.
4. ¶44 United Nations (2024). *SEEA Ecosystem Accounting*, para 5.16–5.18; Table 5.7 (condition variable classification by characteristic class).
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6. ¶56 UNSD. ISIC Rev.4 to ISIC Rev.5 correspondence tables. Available at: <https://unstats.un.org/unsd/classifications/Econ/ISIC> (<https://unstats.un.org/unsd/classifications/Econ/ISIC>). Compilers should document the classification version (Rev.4 or Rev.5) applied in their metadata to support time-series comparability.
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8. ¶58 United Nations (2024). *ISIC Rev.5, Part Three, Division 50*.
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4. ¶64 United Nations (2024). *CPC Ver.3.0, Part One, Chapter I*.
5. ¶65 United Nations (2024). *CPC Ver.3.0, Division 04*.
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3. ¶73 CEPA and CReMA are international classifications developed jointly by Eurostat and UNSD for use in environmental-economic accounting worldwide. The Eurostat explanatory notes represent custodian-agency guidance; SEEA CF Chapter 4 provides the broader international framework context.
4. ¶74 UNSD Classifications portal: <https://unstats.un.org/unsd/classifications> (<https://unstats.un.org/unsd/classifications>). For the joint Eurostat-UNSD work on the Classification of Environmental Purposes (CEP) as the successor to CEPA and CReMA, see the UNSD classifications portal and associated Eurostat/UNSD working documents. Consistent with the format used for footnote 68 (COFOG revision portal reference).
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6. ¶76 Eurostat (2020). *CEPA and CReMA Explanatory Notes*, CEPA 4.
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1. ¶81 United Nations (2024). *CPC Ver.3.0, Part One, Chapter I*.
2. ¶82 Based on review of ISIC Rev.5 and CEPA/CReMA classifications; see research notes for TG-0.2.

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CONTENTS

1. Requirements 3

2. Acknowledgements 3

 2.1 Global Ocean Accounts Partnership 3

 2.2 Institutional Contributors 3

 2.3 Individual Contributors 5

 2.4 Funding and Support 8

3. Circular Publication Information 8

4. References 8

ABOUT THIS CIRCULAR

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1. Requirements

¶1 None. This Circular serves as a standalone reference.

2. Acknowledgements

2.1 Global Ocean Accounts Partnership

¶1 The Global Ocean Accounts Partnership (<https://www.oceanaccounts.org/>) (GOAP) represents a commitment to improving, harmonising, and applying ocean-related data in accordance with international standards and in keeping with the 2030 Agenda for Sustainable Development. The Partnership was established in response to growing recognition that no single organisation has the mandate or influence to improve how the ocean is measured, how its benefits are realised, or how it is protected. Effective ocean accounting requires collaboration across levels, countries, disciplines, and sectors. ESCAP initiated the first Asia and the Pacific Regional Expert Workshop on Ocean Accounts in August 2018 and supported pilot studies in China, Indonesia, Malaysia, Samoa, Thailand, Vanuatu, and Viet Nam during 2019.

¶2 The GOAP Panel of Technical Experts comprises specialists in various aspects of ocean accounting from around the world. Its work is framed towards improving understanding of the economic and scientific factors affecting the health of the ocean, and towards generating information that will make more effective action possible. The Panel identifies new challenges in ocean accounting, provides advisory assistance to countries undertaking ocean accounts, and defines priority areas for technical guidance development. The UN Statistical Commission requested ESCAP and UN Environment to take the lead in developing guidance for ocean statistics. The Technical Guidance also provides input to, and benefits from, the revision of the System of Environmental-Economic Accounting (SEEA) and the development of SEEA for Oceans¹.

2.2 Institutional Contributors

¶1 Founding and hosting institutions

- ¶2 University of New South Wales (UNSW) – hosts the GOAP Secretariat
- ¶3 United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) – founding partner, pilot study coordination

¶4 United Nations system

- ¶5 United Nations Statistics Division (UNSD)
- ¶6 United Nations Environment Programme (UN Environment)
- ¶7 Intergovernmental Oceanographic Commission of UNESCO, Sub-Commission for the Western Pacific (IOC-UNESCO WESTPAC)
- ¶8 Food and Agriculture Organization of the United Nations (UN-FAO)
- ¶9 International Union for Conservation of Nature (IUCN)
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- ¶12 Organisation for Economic Co-operation and Development (OECD)
- ¶13 World Bank
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- ¶57 Statistics Canada
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- ¶59 National statistical offices of Bangladesh, Cambodia, Fiji, Indonesia, Myanmar, Palau, Papua New Guinea, Philippines, Sri Lanka, Timor-Leste, and Vanuatu (through workshops and dialogues)

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¶1 The Technical Guidance benefited from the enthusiasm and technical excellence of the participants in the ESCAP pilot studies.

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2.3.7 Consultation Contributors (Second Edition)

¶1 The global consultation on the Second Edition invites comment from anyone who produces, checks or uses ocean accounts. Two lists will be published here when the consultation closes.

¶2 **Consultation respondents** – everyone who commented under their own name and asked to be recognised, listed alphabetically with their organisation, with no comment attributed to

any individual.

¶3 **Named contributors to a circular** – respondents whose comments were accepted and substantively changed a circular are additionally named on that circular itself, in its contributor list, and are carried in its citation. The threshold, per circular, is one accepted substantive comment that supplied the replacement wording or a supporting reference, or three or more accepted substantive comments; a substantive comment is one that changes a definition, method, classification, recommendation, data source, numeric value or factual claim, as distinct from a typographic or formatting correction. Anonymous comments carry no identity and cannot be credited. Every entry is confirmed with the person before it is published. The full criteria are set out in [How to comment](#).

¶4 [To be completed upon closure of the global consultation.]

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¶2 [Additional funding acknowledgements to be confirmed.]

3. Circular Publication Information

Role	Contributors
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4. References

- ¶1 United Nations et al. (2021). *System of Environmental-Economic Accounting – Ecosystem Accounting* (SEEA EA). United Nations, New York. Available at: <https://seea.un.org/ecosystem-accounting> (<https://seea.un.org/ecosystem-accounting>)
- ¶2 GOAP (2021). *Technical Guidance on Ocean Accounting for Sustainable Development* (First Edition). Global Ocean Accounts Partnership. Available at: <https://www.oceanaccounts.org/> (<https://www.oceanaccounts.org/>)

Structure and Focus of the Technical Guidance

Explains how the Technical Guidance is organised, the meta-structure each circular follows, and the conventions for versioning and stability badges.

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Drafting AI-assisted drafting from GOAP Secretariat source materials; source list to be published at the close of consultation.

OUTCOME

After reading this Circular, you will understand how the Technical Guidance on Ocean Accounting is organised, the meta-structure each circular follows, the conventions for versioning, stability classification, and dependency tracking, and the production process for circulars. This Circular is a reference for authors, editors, and users of the Technical Guidance.

CONTENTS

1. Outcome	3
2. Requirements	3
3. Organisation of the Technical Guidance	3
3.1 Section Structure	3
3.2 Circular Numbering	3
3.3 Stability Classification (Badges)	4
4. Circular Meta-Structure	4
4.1 YAML Frontmatter Specification	4
4.2 Metadata Display Block	5
4.3 Standard Section Structure	5
4.4 Section Content Guidelines	6
4.5 Section Scope Tests	6
5. Page Length Guidance	7
6. Version and Revision Policy	8
6.1 Version Numbering	8
6.2 Revision Policy	8
6.3 Superseded Versions	8
7. Production Process	8
7.1 Circular Development Workflow	8
7.2 Publication Cadence	9
8. Dependency and Prerequisites	9
8.1 Dependency Tracking	9
8.2 Dependency Principles	9
8.3 Dependency Graph	9
9. Cross-Cutting Themes	9
10. Acknowledgements	10
11. References	10

ABOUT THIS CIRCULAR

RECOMMENDED CITATION

Structure and Focus of the Technical Guidance (2026) (GOAP Technical Guidance on Ocean Accounting, TG-0.4, v0.10.1). GOAP Secretariat.
<https://guidance.oceanaccounts.org/circulars/section-0/0-4-structure/>

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1. Outcome

¶1 After reading this Circular, you will understand how the Technical Guidance on Ocean Accounting is organised, the meta-structure each circular follows, the conventions for versioning, stability classification, and dependency tracking, and the production process for circulars. This Circular is a reference for authors, editors, and users of the Technical Guidance.

2. Requirements

¶1 None.

¶2 ⓘ Framework Position

¶3 This Circular is a meta-circular: it describes how the Technical Guidance itself is organised rather than providing substantive ocean accounting methodology.

3. Organisation of the Technical Guidance

3.1 Section Structure

¶1 The Technical Guidance is organised into seven sections:

Section	Title	Circulars	Purpose
0	Concepts, Definitions and Front Matter	8 (TG-0.1–0.8)	Foundational materials: conceptual framework, standards, glossary, QA principles
1	Using Ocean Accounts in Decision-Making	13 (TG-1.0–1.12)	Policy applications: how accounts inform planning, finance, and management. TG-1.0 is the section-framing circular: it is the entry point to the section, and establishes the vocabulary the other twelve use
2	Indicators	13 (TG-2.1–2.13)	Indicator methods: deriving decision-relevant metrics from accounts. One exception: TG-2.12 Spatial Data Frameworks is a data-methods circular on the Section 4 definition, numbered here for historical reasons and to be renumbered at the Second Edition
3	Accounts Compilation	16 (TG-3.1–3.16)	Core methodology: building accounts tables from data sources
4	Data Methods	12 (TG-4.1–4.12)	Data methods: collection, processing, quality assurance
5	Geographic and Thematic Case Studies	12 (TG-5.1–5.13; 5.12 reserved)	Implementation examples from partner countries
6	Thematic Methods	15 (TG-6.1–6.15)	Deep-dive methods for specific ecosystems, sectors, asset classes and intervention classes

3.2 Circular Numbering

¶1 Each circular is identified by: TG-[Section] . [Number]

- ¶2 **TG-0.1:** Section 0, Circular 1
- ¶3 **TG-6.14:** Section 6, Circular 14 (Marine and Coastal Tourism Accounting)

¶4 The number `.0` is reserved for a section-framing circular: one that establishes the vocabulary and the routing the rest of its section depends on, and that carries no method of its own. Section 1 has one, TG-1.0, because the terminology of ocean economy measurement is used by the other twelve circulars in that section. Sections without such a circular begin at `.1`, and a `.0` is not to be created to complete a pattern.

¶5 The version number is recorded in the circular's YAML frontmatter as a separate `version` field (e.g., `version: "0.2.0"`). Major increments reflect substantive content changes, whilst minor increments reflect editorial improvements.

3.3 Stability Classification (Badges)

¶1 Each circular carries a stability badge indicating its relationship to underlying standards. See TG-0.5 Navigating the Technical Guidance for full definitions. Summary:

Badge	Meaning	Update Trigger
Core	Based on adopted international standards (2025 SNA, SEEA CF, SEEA EA)	Only when standards are formally revised
Applied	Interprets standards for ocean context; stable but may evolve	Annual review cycle
Emerging	Addresses topics where standards are still developing	Updated as standards crystallise

4. Circular Meta-Structure

¶1 All circulars follow a standard structure to ensure consistency for readers. This section specifies the template for circular authors.

4.1 YAML Frontmatter Specification

¶1 Every circular begins with machine-readable YAML frontmatter:

```
---
title: "Circular Title"           # Required: Full title
circular_id: TG-X.Y              # Required: Circular identifier
badge: Applied                   # Required: Core | Applied | Emerging
version: "0.1.0"                 # Required: consultation version (0.Major.Minor)
circular_status: Draft           # Required: Draft | Completed | Planned
last_updated: Month Year         # Required: e.g. May 2026
prerequisites:                   # Required: List of prerequisite circular IDs (empty array
[] if none)
  - TG-0.1
  - TG-X.Z
enables:                         # Optional: Circulars this one enables
  - TG-A.B
---
```

¶2 **Editorial fields only.** The block above is what a circular author writes. Each page also carries platform frontmatter – `project`, `visibility`, `status`, `content_type`, `brand`, `sidebar_category` and `sidebar.order` – which the `/new-page` skill sets and authors do not hand-edit.

¶3 **status and circular_status are different fields.** `status` is the platform publish gate (`working` or `published`) and governs whether a page is built at all. `circular_status` is the editorial state (`Draft`, `Completed`, `Planned`) shown in the metadata table. A page can be `status:`

published and `circular_status: Draft` at the same time – that is the normal state for a circular out for consultation.

¶4 **Note on badge** : See Section 3.3 for stability classification definitions. **Note on publication version**: The `version` field reflects the public publication version, not the internal pipeline draft count. Pipeline drafts (e.g., draft-v4, draft-v6) are production artefacts only, and the publication version is confirmed by the Secretariat before a circular moves to Completed status.

4.2 Metadata Display Block

¶1 The site renders a metadata table automatically from YAML frontmatter (`circular_id` , `version` , `badge` , `circular_status` , `last_updated`). Authors do not hand-write the display block in the markdown body.

¶2 Required frontmatter fields for the metadata table:

```
circular_id: TG-X.Y
version: "0.1.0"
badge: Applied           # Core | Applied | Emerging
circular_status: Draft   # Draft | Completed | Planned
last_updated: Month Year  # e.g. May 2026
```

¶3 **Note on Last Updated**: Manually maintained by the author at publication time.

4.3 Standard Section Structure

Standard Circular Template (Sections 1–4, 6)

```
# Circular Title

## 1. Outcome
[What readers will achieve -- 1-2 paragraphs]

## 2. Requirements
[Prerequisites with hyperlinks to other circulars]

## 3. Guidance Material
### 3.1 [Topic]
### 3.2 [Topic]
...
[Core methodology -- bulk of content]

## 4. Acknowledgements
**Authors:** [To be confirmed]
**Reviewers:** [To be confirmed]

## 5. References
[Footnotes or bibliography]

## Appendixes (if needed)
### A. Worked Example
### B. Sample Code
### C. Detailed Tables
```

¶1 **Note on numbering**: Acknowledgements is always second-to-last and References always last, numbered consecutively after whatever Guidance content is present. An optional “Limitations and Considerations” section may appear between Guidance Material and Acknowledgements, in which case it becomes Section 4, whilst Acknowledgements and References shift to Sections 5 and 6 respectively.

Case Study Template (Section 5)

¶1 Section 5 circulars use an adapted structure for country/regional case studies:

```
# [Country/Region]

## 1. Outcome
## 2. Requirements
## 3. Country/Regional Context
## 4. Implementation Approach
### 4.1 Institutional Arrangements
### 4.2 Data Sources
### 4.3 Methods Applied
## 5. Accounts Developed
## 6. Decision Applications
## 7. Lessons Learned
### 7.1 Successes
### 7.2 Challenges
### 7.3 Recommendations
## 8. Acknowledgements
## 9. References
## Appendixes
```

¶2 **Note:** This template has not yet been validated against compiled Section 5 drafts. Authors should cross-check against TG-5.x working drafts when available.

Front Matter Template (Section 0)

¶1 Section 0 circulars have unique structures appropriate to their purpose:

- ¶2 **0.1 General Introduction:** Extended conceptual content with figures
- ¶3 **0.5 Navigating:** Primarily visual/tabular (dependency graphs, pathways)
- ¶4 **0.6 Glossary:** Definition list format organised alphabetically
- ¶5 **0.7 QA Principles:** Reference document format with standards citations

¶6 Any Section 0 circular not listed above follows the Standard Circular Template.

4.4 Section Content Guidelines

Section	Purpose	Key requirements
1. Outcome	State what readers will achieve	1–2 paragraphs; active voice; specific capability or knowledge gained
2. Requirements	List prerequisites	Hyperlinked circular IDs with brief description; “None” if no prerequisites
3. Guidance Material	Core methods and explanations	Hierarchical subsections; cite standards with paragraph numbers; tables and figures for complex content
4. Limitations (optional)	Caveats and misapplication risks	Include when methodology has significant limitations; flexible length
Acknowledgements	Authors and reviewers	List with affiliations
References	Citations	Footnote format for in-text citations; numbered list acceptable when no in-text anchors present

4.5 Section Scope Tests

¶1 Each section’s scope is stated in Section 3.1. The tests below say what that scope means when an author is deciding whether a passage belongs in the circular they are writing. They were derived

from the Section 1 review of September 2026 and the Section 3 review that followed it, both of which found method distributed across sections that had no rule to test it against.

Section	The circular gives	It cross-refers for
1 Decision-Making	Which accounts and indicators bear on a decision, how to read them, how to present them	How they are built (2, 3, 4, 6)
2 Indicators	The indicator's definition, normalisation and aggregation	The account it is derived from (3)
3 Accounts Compilation	The account table – its rows, columns and accounting identities – and the compilation procedure that populates it	Sector-specific method (6), measurement protocol and data source (4), the indicator derived from it (2), the decision that uses it (1)
4 Data Methods	The variable delivered to an account: definition, source, unit, coverage, reference value, uncertainty, quality tier	The account the variable enters (3)
5 Case Studies	What one country did and what others can act on	Every method it applied
6 Thematic Methods	Method specific to one ecosystem, sector, asset class or intervention class	The generic account structure it populates (3), the measurement protocol (4), the indicator derived from it (2), and readiness and sequencing (0.8)

¶2 Two consequences are worth stating explicitly, because both have been breached in practice:

- ¶3 **A Section 4 worked example may show a variable being produced and quality-assured; it should not show an account being balanced.** Balancing an account is Section 3 work, and so is the valuation choice that populates a monetary cell.
- ¶4 **Section 3 keeps what generalises across assets** – the boundary decision, the classification into SEEA asset categories, the account rows and identities. Sector-specific method belongs in Section 6, named by circular. Where a Section 3 circular is the only place a method appears, it moves rather than being deleted.
- ¶5 **Section 6 is not only ecosystems and industries.** The row above was widened in September 2026 after a read-across of the whole section found four circulars that the earlier wording did not admit: TG-6.11 treats an asset class, TG-6.12 a residual-flow class, TG-6.13 a spatial interface between two accounting domains, and TG-6.15 an intervention class. All four give method specific to their subject and cross-refer for the generic structure, which is the operative half of the test; the earlier wording named only ecosystems and sectors and so excluded them by accident rather than by decision.
- ¶6 **Where two Section 6 circulars can record the same entry, one of them owns it and says so.** The read-across found four such overlaps – submerged artificial structures, the coastal protection service, blue carbon pricing, and nutrient loads to coastal waters – each recorded in two places without a rule. A Section 6 circular that shares an account entry with another must name the owner in its boundary statement or at the point of overlap.

¶7 Every circular in Sections 1 to 4 and 6 should carry a short boundary statement, in its `:::note[Framework Position]` block or immediately after it, naming which account or decision it owns and which circulars own the method it excludes. TG-3.9 is the model.

5. Page Length Guidance

¶1 Page counts refer to rendered PDF A4 pages at approximately 500 words per page. These are guidance targets, not enforced limits.

Section	Typical Length	Notes
Section 0 (Front Matter)	Variable	0.1 and 0.5 are longer by design
Section 1 (Decision-Making)	4–6 pages	Conceptual + examples
Section 2 (Indicators)	~4 pages	Methods focus
Section 3 (Accounts Compilation)	6–8 pages	Detailed methodology
Section 4 (Data Methods)	4–6 pages	Practical procedures
Section 5 (Case Studies)	8–12 pages	Full treatment
Section 6 (Thematic Methods)	6–8 pages	Ecosystem/sector deep-dives

6. Version and Revision Policy

6.1 Version Numbering

¶1 Format: `v0.[Major].[Minor]` – the leading `0.` marks the consultation edition, which is not adopted guidance

- ¶2 **Major version** (v0.1.0 → v0.2.0): Substantive content changes – new standards incorporated, significant methodological corrections, structural reorganisation
- ¶3 **Minor version** (v0.1.0 → v0.1.1): Editorial improvements – clarifications, added examples, typographic corrections, updated cross-references

6.2 Revision Policy

- ¶1 All circulars undergo **annual review** to assess whether updates are needed
- ¶2 **Core** circulars are updated only when underlying standards change
- ¶3 **Applied** and **Emerging** circulars may be updated based on implementation experience

6.3 Superseded Versions

¶1 Superseded versions will be archived, with the URL scheme to be confirmed. The current version always appears at the canonical URL.

7. Production Process

7.1 Circular Development Workflow

¶1 Table 7.1 below summarises the full per-circular review lifecycle for the Second Edition.

Phase	Description
Triage	Issues raised against each draft are triaged (immediate-fix, verification-needed, user-input-needed) and recorded in the draft's issue inventory.
Draft compilation	A new draft is compiled applying all closed/fixed resolutions; each draft has a paired revision log.
Director review	The draft undergoes a director-level quality gate; findings logged in <code>director-review-vN.md</code> .
Director fixes	Actionable director-review findings are applied to the draft.
Secretariat review	New issues raised are logged in <code>secretariat-review-vN.md</code> and feed the next triage cycle.
Publication	Approved circular published with DOI assignment.

¶2 Internal production uses an extended triage / director-review / Secretariat-review pipeline. Details are documented in project tooling and are not part of this public-facing circular.

7.2 Publication Cadence

¶1 Circulars are published on a monthly cadence following Secretariat review, with publication frequency varying by batch. Priority circulars may be fast-tracked, and updates to existing circulars are published as needed.

8. Dependency and Prerequisites

8.1 Dependency Tracking

¶1 Dependencies are tracked in two ways:

1. ¶2 **YAML frontmatter:** `prerequisites` and `enables` fields in each circular
2. ¶3 **Prose requirements section:** Human-readable list with hyperlinks (Section 2 of each circular)

¶4 The `prerequisites` field and the prose Requirements section must be kept synchronised. The `enables` field is machine-readable only and has no prescribed prose counterpart.

8.2 Dependency Principles

Principle	Guidance
Explicit prerequisites	Only list circulars that are genuinely required.
Minimal dependencies	Avoid unnecessary prerequisites that create barriers.
Bidirectional tracking	When adding a prerequisite, update the <code>enables</code> field of the prerequisite circular.
Foundational circulars	Explicit listing of foundational circulars (e.g., TG-0.1) is recommended even when transitively covered; omit only for mid-chain intermediaries.

8.3 Dependency Graph

¶1 See TG-0.5 Navigating the Technical Guidance for the visual dependency graph.

9. Cross-Cutting Themes

¶1 Cross-cutting themes are catalogued in TG-0.5 Navigating the Technical Guidance. Authors should ensure consistency with the treatments described there. Key threads include:

Theme	Thread
Spatial methods	0.1 (BSU concept) → 3.1 (spatial asset delineation) → 4.1 (remote sensing) → 6.x (ecosystem-specific)
Monetary valuation	1.9 (whether and when to value) → 2.4 §3.10 (method preference order and the methods themselves) → 3.1 §3.3 (asset-level NPV) → 6.x (context-specific) → 5.x (case studies)
Uncertainty	0.7 (QA principles) → relevant methods circulars
Governance	1.1–1.2 (decision-making entry points) → 3.7 (governance accounts) → 5.x (all case studies)
Traditional knowledge	0.1 (conceptual framing) → 3.6 (traditional knowledge accounts) → 5.x (case studies)
Sub-national applicability	3.11 (sub-national accounts) → 5.x (case studies, where applicable)

Theme	Thread
Ocean economy	1.0 (terms, and what an account can certify) → 3.3 (boundary and account) → 2.5 (indicators) → 1.1 / 1.10 (use) → 5.x (case studies)

10. Acknowledgements

- ¶1 **Authors:** [To be confirmed]
- ¶2 **Reviewers:** [To be confirmed]

11. References

1. ¶1
GOAP. (2024). *Discussion Paper: Modular Structure for GOAP Technical Guidance* (internal working paper, GOAP Secretariat, not publicly distributed). Global Ocean Accounts Partnership.

2. ¶2
United Nations. (2025). *System of National Accounts 2025*. United Nations.

3. ¶3
United Nations. (2021). *System of Environmental-Economic Accounting—Ecosystem Accounting*. United Nations.

4. ¶4
UNECE. (2019). *Generic Statistical Business Process Model (GSBPM)*, Version 5.1.

DRAFT

Navigating the Technical Guidance

Helps readers identify the circulars relevant to their role, understand the dependency structure, and select an appropriate reading sequence.

Version 0.12.0 **Status** Draft **Stability** Core

Last updated September 2026 **Responsible officer** Dr Jordan Gacutan

Drafting AI-assisted drafting from GOAP Secretariat source materials; source list to be published at the close of consultation.

OUTCOME

Readers will identify the circulars relevant to their role, understand the dependency structure, and select an appropriate reading sequence.

DRAFT

CONTENTS

1. Outcome	3
2. Requirements	3
3. Structure Overview	3
3.1 Stability Classification (Badges)	3
3.2 Version Numbering	3
4. Edge Mapping: Framework to Circulars	3
5. Audience Pathways	4
5.1 Policy Executive	4
5.2 National Statistician	5
5.3 Ecosystem Analyst	5
5.4 Blue Finance Practitioner	5
5.5 MSP/MPA Practitioner	5
5.6 Social Scientist	5
5.7 Implementation Coordinator	6
5.8 Research Frontier	6
5.9 Sub-National Planner	6
5.10 Indigenous and Community Practitioner	6
6. Thematic Entry: Finding the Circular for Your Ecosystem or Sector	6
7. Dependency Graph	7
8. Quick Reference: All Circulars	8
9. Acknowledgements	8

ABOUT THIS CIRCULAR

RECOMMENDED CITATION

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<https://guidance.oceanaccounts.org/circulars/section-0/0-5-navigating/>

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1 Framework Position

A reader's guide to the full Technical Guidance. This circular maps TG-0.1 to specific circulars and provides role-based reading pathways. Read after TG-0.1.

Not sure where to start? Use **Find the right circular**: guided question flow, faceted topic browser, or free-text search.

1. Outcome

Readers will identify the circulars relevant to their role, understand the dependency structure, and select an appropriate reading sequence.

2. Requirements

Essential prerequisites:

- TG-0.1 General Introduction to Ocean Accounts** – for the conceptual framework and the Ocean Accounts Framework structure

3. Structure Overview

3.1 Stability Classification (Badges)

Each circular carries a stability badge. Full definitions and update triggers are in TG-0.4 Section 3.3.

Badge	Meaning	Example
Core	Based on adopted international standards (SNA, SEEA)	TG-0.1, TG-0.6
Applied	Interprets standards for ocean context; stable but may evolve	TG-3.1, TG-6.1
Emerging	Addresses topics where standards are still developing	TG-3.5, TG-6.5

3.2 Version Numbering

Version numbers appear in each circular's frontmatter **version** field. Full revision policy is in TG-0.4 Section 6.

4. Edge Mapping: Framework to Circulars

Edges from TG-0.1 Figure 0.1.2 mapped to their primary circulars. Edges E3, E4, and E11 are bidirectional.

Abbreviations: FG1 = Focal Group 1: Ocean Economy; FG2 = Focal Group 2: Ocean Society; FG3 = Focal Group 3: Intermediate Ecosystem Services; SG1 = Supporting Group 1: National Accounts (SNA framework); SG2 = Supporting Group 2: Social Conditions; SG3 = Supporting Group 3: Ocean Environment and Ecosystem. Full definitions in TG-0.1 Section 2.

Edge	Direction	Description	Primary Circular(s)	Relevant pathways
E1	FG1 → SG3	Pollution/residuals from economy to environment	3.4 Flows econ → env , 2.7 Pollution flows	5.2 National Statistician, 5.3 Ecosystem Analyst

Edge	Direction	Description	Primary Circular(s)	Relevant pathways
E2	FG2 → SG3	Pollution/residuals from society to environment	3.4 Flows econ → env , 3.5 Social accounts	5.2, 5.6 Social Scientist
E3	FG1 ↔ SG1	Monetary flows between assets and economic sectors	3.1 Assets, 3.3 Economic activity	5.2, 5.4 Blue Finance
E4	FG2 ↔ SG1	Social activities ↔ SNA assets	3.5 Social accounts	5.6 Social Scientist
E5	FG1 → SG2	Economic contributions to social conditions	3.5 Social accounts , 3.3 Economic activity	5.2, 5.6
E6	FG2 → SG2	Social activities to social conditions	3.5 Social accounts , 3.7 Governance	5.6, 5.7 Implementation Coordinator
E7	SG2 → FG1	Social assets enabling economic flows	3.7 Governance, 3.3 Economic activity	5.6, 5.7
E8	SG2 → FG2	Social assets enabling social activities	3.5 Social accounts , 3.7 Governance	5.6
E9	SG3 → FG1	Ecosystem services to economy (SEEA)	3.2 Flows env → econ , 2.4 Ecosystem goods/services	5.2, 5.3, 5.4
E10	SG3 → FG2	Ecosystem services to society	3.2 Flows env → econ , 3.5 Social accounts	5.3, 5.6
E11	FG3 ↔ SG3	Intermediate ecosystem services	3.2 Flows env → econ , 2.1 Biophysical indicators	5.3, 5.2

5. Audience Pathways

¶1 Ten archetypes below with core sequences and extensions. For an interactive match, use **Find the right circular**. A Corporate Sustainability pathway (ESG/TNFD/CSRD) is under development.

5.1 Policy Executive

¶1 **Audience:** Ministers, senior government officials, heads of agencies

Entry Point	Core Sequence	Extensions
0.1 General Introduction	0.1 → 1.0 Ocean Accounting and the Blue/Ocean Economy (the framing circular for Section 1) → relevant 1.x (policy context) → one 5.x case study	Delegate detail to technical staff

5.2 National Statistician

¶1 **Audience:** NSO compilers, official statisticians building ocean accounts

Entry Point	Core Sequence	Extensions
0.1 General Introduction	0.1 → 0.2 → 3.1 → 3.2 → 3.3 → 3.4	4.1 → 4.2 → 4.3 (data methods); 2.x indicators for validation; 3.5–3.8 for expanded account types

¶2 **Note:** Focus on TG–3.1–3.4 before adding social or thematic modules.

5.3 Ecosystem Analyst

¶1 **Audience:** Technical staff measuring ecosystem assets, condition, and services

Entry Point	Core Sequence	Extensions
0.1 → 3.1 Assets	0.1 → 3.1 → 3.2 (env → econ flows) → 2.4 (ecosystem goods/services)	1.9 Valuation, 5.x cases

5.4 Blue Finance Practitioner

¶1 **Audience:** Development banks, fund managers, sovereign debt offices, impact investors

Entry Point	Core Sequence	Extensions
1.7 Multilateral Finance	0.1 → 3.1 → 3.2 → 1.9 → 1.7 → 1.8	5.2 Belize, 5.6 Maldives, 5.5 Indonesia, 2.6 Investment indicators

¶2 **Why this sequence:** TG–3.1–3.2 establish the asset and flow accounts. TG–1.9 explains how to translate these into monetary values relevant to finance. TG–1.7–1.8 then demonstrate how those values inform multilateral and project-level instruments.

5.5 MSP/MPA Practitioner

¶1 **Audience:** Spatial planners, marine park managers, coastal zone managers focused on spatial tools

Entry Point	Core Sequence	Extensions
1.2 MSP	0.1 → 1.2 → 1.3 (MSM/MPAs) → 3.1 (assets) → 4.1 (spatial data and remote sensing)	6.1 Coral Reefs, 6.2 Mangroves – select thematic circulars matching your ecosystem type; 2.4 Ecosystem goods/services; 5.3 Fiji, 5.9 Vanuatu, 5.5 Indonesia

5.6 Social Scientist

¶1 **Audience:** Researchers on livelihoods, equity, governance, traditional knowledge

Entry Point	Core Sequence	Extensions
3.5 Social Accounts	0.1 → 3.5 → 3.6 (traditional knowledge) → 3.7 (governance) → 2.3 (livelihood dependencies)	2.8 Climate indicators , 1.4 Sustainable Ocean Planning

5.7 Implementation Coordinator

¶1 **Audience:** Country project managers, NSO leads, inter-ministerial task force chairs

Entry Point	Core Sequence	Extensions
0.8 Readiness Assessment	0.8 → 0.1 → 4.7 (data coordination) → 3.8 (combined presentations) → relevant 3.x	1.10 (national planning), 5.x case studies

5.8 Research Frontier

¶1 **Audience:** Academics, methodologists extending ocean accounting state of the art

Entry Point	Core Sequence	Extensions
0.2 + “Emerging” circulars	0.1 → 0.2 → all “Emerging”-badged circulars	Contribute to new emerging methods

5.9 Sub-National Planner

¶1 **Audience:** Provincial and municipal planning officers, sub-national resource managers

Entry Point	Core Sequence	Extensions
3.11 Sub-National Accounts	0.1 → 3.11 → 3.8 → 1.2 (spatial planning decisions)	2.1 Biophysical indicators, 6.2 Mangroves, 6.1 Coral Reefs, 5.4 India, 5.5 Indonesia

5.10 Indigenous and Community Practitioner

¶1 **Audience:** Traditional resource managers, community leaders, Indigenous data custodians, or-
ganisations working on Indigenous data sovereignty

Entry Point	Core Sequence	Extensions
3.6 Traditional Knowledge	0.1 → 3.6 → 3.5 → 1.3 (MPA/governance decisions)	2.3 Livelihood dependencies, 3.7 Governance, 5.3 Fiji, 5.9 Vanuatu

¶2 **Note:** Not all sections are equally relevant to community-level practitioners: concentrate on the circulars above. Case studies from Fiji and Vanuatu demonstrate Pacific context applications.

6. Thematic Entry: Finding the Circular for Your Ecosystem or Sector

¶1 The pathways above start from a reader’s role. Most compilers arrive the other way round – with a mangrove belt, a port, a fishery or a litter problem already in front of them – and need the thematic method first. Section 6 is the entry point for that route, and each of its circulars names the generic circulars it sits on.

If your subject is	Start at	It cross-refers to
Coral reefs (photic, M1.3)	6.1 Coral Reef Accounting	3.1, 4.1, 4.8, 4.9, 2.4
Mangroves, saltmarsh, deltas	6.2 Mangrove and Coastal Wetland Accounting	3.1, 4.1, 4.8, 4.9, 2.8

If your subject is	Start at	It cross-refers to
Seagrass meadows	6.3 Seagrass Ecosystem Accounting	3.1, 4.1, 2.1, and 6.2 for carbon pricing
Kelp forests, rocky reefs	6.4 Kelp Forest and Temperate Reef Accounting	3.1, 4.1, 2.1, 3.6
Open ocean, migratory stocks	6.5 Pelagic and Open Ocean Accounting	3.1, 6.6 for jurisdiction, 6.7 for stocks
Deep sea, ABNJ, seabed minerals	6.6 Deep Sea and ABNJ Accounting	3.1, 3.10, 2.10
Wild-capture fisheries	6.7 Fisheries Accounting	3.1, 3.9, 4.10, 4.11, 1.5
Aquaculture	6.8 Aquaculture Thematic Methods	3.9, 3.4, 4.3, 6.7
Offshore energy, decommissioning	6.9 Offshore Energy Thematic Methods	3.10, 3.4, 1.2
Shipping and ports	6.10 Maritime Transport and Ports	3.3, 3.4, 2.5, 2.8
Seawalls, ports, coastal works	6.11 Coastal Infrastructure Accounting	3.1, 4.1, 4.3, 2.9
Marine litter and plastics	6.12 Marine Litter and Plastics Accounting	3.4, 2.7, 2.10, 2.11
Catchments, estuaries, nutrients	6.13 Freshwater-Marine Interaction Accounting	3.2, 3.4, 3.11, 6.2
Coastal and marine tourism	6.14 Marine and Coastal Tourism Accounting	3.3, 2.5, 2.6
Restoration and nature-based solutions	6.15 Ocean Accounting for Nature-based Solutions	3.1, 2.4, 6.11, and the ecosystem circulars

¶2 Two cautions apply to this route. A thematic circular is not a substitute for the generic one it sits on: it assumes [3.1 Asset Accounts](#) or [3.3 Economic Activity](#) has been read. And where two thematic circulars can record the same entry, the boundary statement at the head of each names the owner – read both before compiling either.

¶3 Not every marine ecosystem has a circular in this edition. The M1 shelf types other than M1.1, M1.2, M1.3 and M1.6, together with M1.4 shellfish beds and reefs and the MT1 shoreline biome, have no dedicated circular; compile them under [3.1](#) with condition variables selected under [4.8](#) and [4.9](#), and document the departure.

7. Dependency Graph

¶1 Figure 0.5.1 illustrates the full prerequisite network across all active circulars. Nodes are coloured by section, and directed edges record which circulars depend on or enable others.

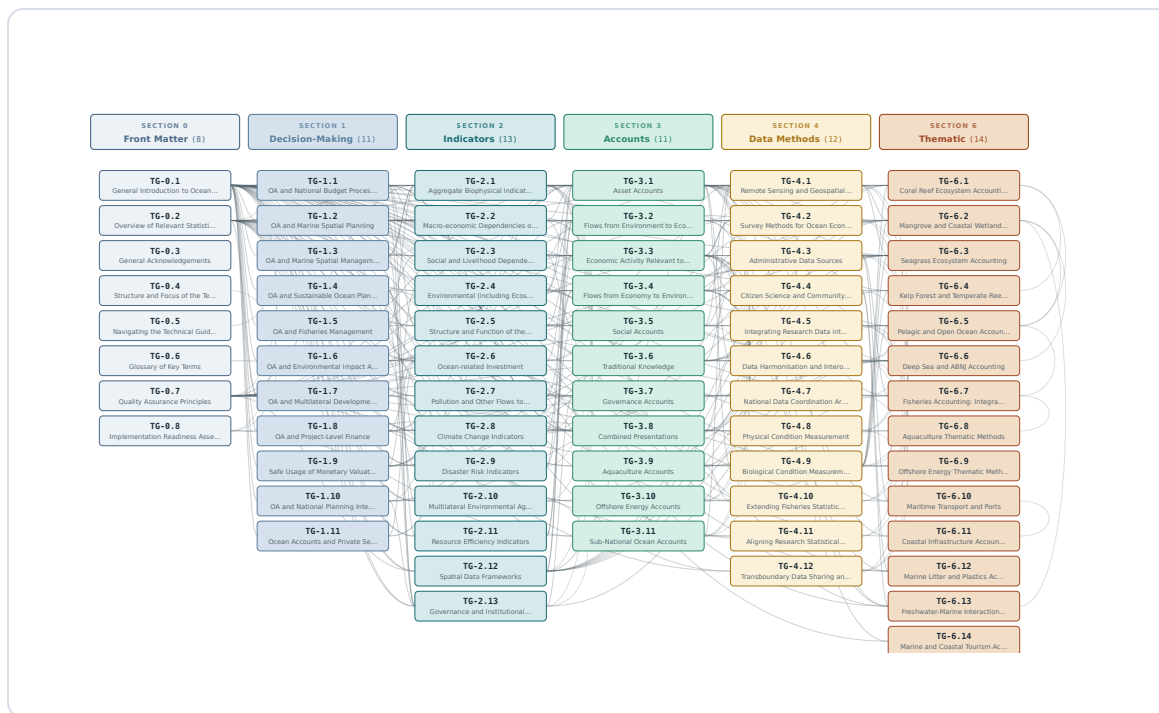


Figure 0.5.1 Prerequisite network of 69 active circulars across six sections; nodes coloured by section.

Source: TG circulars frontmatter `prerequisites:` and `enables:` fields, snapshot 2026-06-01 across `src/circulars/section-{0,1,2,3,4,6}/`.

- ¶2 **Foundation chain:** [TG-0.1](#) → [TG-0.2](#) → [TG-0.5](#) (this circular). [TG-0.1](#) is the universal entry point.
- ¶3 **Accounts compilation chain:** [TG-0.1](#) + [TG-0.2](#) → [TG-3.1](#) → [TG-3.2](#) → [TG-3.3](#) → [TG-3.4](#). [TG-3.5](#) – [TG-3.8](#) extend from this core.
- ¶4 **Decision-making chain:** [TG-0.1](#) → Section 1 (accessible after [TG-0.1](#)). Section 2 indicators typically require [TG-3.1](#) for context.
- ¶5 **Data methods chain:** Section 4 supports Section 3. Read it in parallel with or after [TG-3.x](#).
- ¶6 **Case study and thematic methods:** Sections 5 and 6 draw on Sections 3 and 4. Read them after the relevant compilation circulars.
- ¶7 [TG-0.7](#) and [TG-0.8](#) may be read independently at any stage.

8. Quick Reference: All Circulars

- ¶1 For a complete, up-to-date listing of all circulars with badge, status, and dependencies, see the [Circulars Overview](#). Use [Find the right circular](#) for guided topic and audience-based navigation.

9. Acknowledgements

- ¶1 **Authors:** [To be confirmed]
- ¶2 **Reviewers:** [To be confirmed]

Glossary of Key Terms

Provides the canonical definitions for technical terms used throughout the Technical Guidance on Ocean Accounting.

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OUTCOME

This Circular provides the canonical definitions for technical terms used throughout the Technical Guidance on Ocean Accounting. Terms are aligned with the SEEA Glossary, 2025 SNA, and other relevant international statistical standards.

DRAFT

CONTENTS

1. Outcome	3
2. Requirements	3
3. Glossary	3
A	3
B	4
C	5
D	5
E	6
F	7
G	7
H	8
I	8
L	9
M	9
N	9
O	10
P	10
Q	11
R	11
S	11
T	12
U	13
V	13
W	14
4. Sources and Abbreviations	14
Key Sources	14
Standard Abbreviations Used in Technical Guidance	15
5. Acknowledgements	16

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1. Outcome

¶1 This Circular provides the canonical definitions for technical terms used throughout the Technical Guidance on Ocean Accounting. Terms are aligned with the SEEA Glossary, 2025 SNA, and other relevant international statistical standards.

2. Requirements

¶1 None. This Circular serves as a standalone reference for terminology.

3. Glossary

A

¶1 **Abiotic** : Relating to non-living components of an ecosystem, including physical and chemical characteristics such as water temperature, salinity, and substrate type. (SEEA EA)

¶2 **Accounting period** : The time span over which accounts are compiled, typically one year, measuring stocks at the beginning and end and flows during the period. (SNA/SEEA)

¶3 **Accuracy assessment** : Documented evaluation of the correctness of classified geospatial data products or survey measurements, using a confusion matrix to compare observations against ground-reference validation data. See TG-4.1 Remote Sensing and Geospatial Data. (IPCC LULUCF good practice guidance; ISO 19157) : -> See also: Remote sensing, Confusion matrix, Ground reference data

¶4 **Adaptive capacity** : The ability of populations, economies, and institutions to adjust to ecosystem change, absorb shocks, and maintain or improve wellbeing when ocean ecosystems degrade. One of three components of vulnerability, alongside exposure and sensitivity. (IPCC AR6) : -> See also: Vulnerability, Livelihood dependency

¶5 **Administrative data** : Records collected by government agencies in the course of their regular operations for regulatory or operational purposes, as distinct from data collected specifically for statistical purposes. See TG-4.3 Administrative Data Sources. (UNECE, 2011; UN NQAF)

¶6 **Aquaculture** : The farming of aquatic organisms including fish, molluscs, crustaceans and aquatic plants, with some form of intervention in the rearing process to enhance production. See TG-3.9 Aquaculture Accounts. (SEEA CF para. 5.420)

¶7 **Areas Beyond National Jurisdiction (ABNJ)** : Marine areas lying outside the jurisdiction of any state – the high seas (water column) and the Area (seabed and subsoil beyond the limits of national jurisdiction). Ocean accounts are compiled on a national basis, so ABNJ fall outside the national Ecosystem Accounting Area; where an account's scope extends to them, the boundary and the basis for attribution must be documented. See TG-6.6 Deep Sea and ABNJ Accounting. (UNCLOS Part XI; BBNJ Agreement) : -> See also: BBNJ Agreement, Exclusive Economic Zone (EEZ), Ecosystem Accounting Area (EAA), Transboundary data

¶8 **Asset** : A store of value representing a benefit or series of benefits accruing to the economic owner by holding or using the entity over a period of time. (SNA) In Ocean Accounts, produced assets and non-produced assets (natural resources) fall within the SNA core. Ecosystem assets are defined separately under SEEA EA. See also: **Ecosystem asset**. : -> See also: Produced asset, Environmental asset, Ecosystem asset, Natural resource

¶9 **Asset account** : An account that records the opening stock, changes during the accounting period, and closing stock of an asset. See TG-3.1 Asset Accounts. (SEEA) : -> See also: Flow, Stock,

Depletion, Ecosystem asset

¶10 **Avoided damage cost** : A valuation method that estimates the value of an ecosystem service from the costs that would be incurred if the service-providing ecosystem were absent. One of the revealed-preference methods recognised in SEEA EA Chapter 9. (SEEA EA Chapter 9) : -> See also: Valuation, Regulating and maintenance service

B

¶1 **Basic Spatial Unit (BSU)** : The fundamental geographic unit used for spatial accounting in Ocean Accounts. BSUs may be differentiated into terrestrial, coastal, and marine units. Depth-layer extensions for three-dimensional representation are a GOAP Technical Guidance convention. (SEEA EA paras. 3.38–3.42) : -> See also: Exclusive Economic Zone (EEZ), Marine Spatial Planning (MSP), Sub-national accounting unit

¶2 **Bathymetry** : The measurement and mapping of seabed depth and topography. A foundational input to marine ecosystem type delineation, Basic Spatial Unit design and habitat mapping; bathymetric resolution commonly sets the practical floor on the spatial detail an extent account can carry. See [TG-4.1 Remote Sensing and Geospatial Data](#). (IHO S-44; GEBCO) : -> See also: Basic Spatial Unit (BSU), Remote sensing, Ecosystem type, Ecosystem extent

¶3 **BBNJ Agreement** : The Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction, adopted June 2023. (UN) : -> See also: Areas Beyond National Jurisdiction (ABNJ), Exclusive Economic Zone (EEZ), Marine Protected Area (MPA)

¶4 **Benefit transfer** : A valuation approach in which monetary estimates from existing studies at one site are adapted and applied to a new site where primary valuation is not feasible, following adjustments for differences in ecosystem condition, beneficiary population, and economic context. (SEEA EA Chapter 9) : -> See also: Valuation, Ecosystem service

¶5 **Biodiversity** : The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. (CBD, 1992, Art. 2)

¶6 **Biotic** : Relating to living components of an ecosystem, including compositional, structural, and functional characteristics. (SEEA EA)

¶7 **Blended finance** : Financial structures that combine concessional capital from public or philanthropic sources with commercial capital from private investors to mobilise investment in sustainable development. See [TG-1.8 OA and Project-Level Finance](#). (OECD, 2018) : -> See also: Blue financial instruments, Blue bond, Parametric insurance

¶8 **Blue bond** : A fixed-income security whose proceeds are earmarked for ocean-related expenditures that maintain or enhance marine ecosystem assets or support ocean sustainability objectives. See [TG-2.6 Ocean-related Investment](#). (ICMA Green Bond Principles, adapted for ocean) : -> See also: Blue financial instruments, Blended finance

¶9 **Blue carbon** : Carbon stored in coastal and marine ecosystems, primarily through the accumulation of organic matter in mangroves, seagrasses, and tidal marshes. See [TG-6.2 Mangrove and Coastal Wetland Accounting](#). (IPCC AR6 Glossary, 2021) : -> See also: Carbon sequestration, Blue financial instruments

¶10 **Blue economy** : The sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of marine ecosystems. (World Bank, 2017) : -> See also: Ocean economy, Ocean accounts, Natural capital

¶11 **Blue financial instruments** : Financial products designed to generate positive ocean outcomes alongside financial returns. Includes blue bonds, parametric insurance linked to ecosystem

condition, blue carbon credits, and blended finance structures. See [TG-2.6 Ocean-related Investment](#). (GOAP Technical Guidance)

C

¶1 **Capacity (of ecosystem)** : The ability of an ecosystem to generate a specific ecosystem service at the highest yield that does not negatively affect the future supply of that or other ecosystem services. (SEEA EA paras. 6.133–6.141) : -> See also: Ecosystem service

¶2 **Carbon sequestration** : The process by which carbon dioxide is removed from the atmosphere and stored in carbon pools such as oceans, forests, or soils. (IPCC AR6 Glossary, 2021)

¶3 **Citizen science** : The participation of non-professional volunteers in scientific observation, measurement, or data interpretation using structured protocols and digital platforms. In ocean accounting, citizen-science data supplement official monitoring subject to fitness-for-purpose assessment. See [TG-4.4 Citizen Science](#). (GOAP Technical Guidance) : -> See also: Quality assurance (QA), Community-based monitoring, Validation

¶4 **Coastal zone** : The area where land and sea interact, encompassing both terrestrial and aquatic components of the shoreline environment. Compilers should document the spatial boundary adopted. (SEEA EA) : -> See also: Exclusive Economic Zone (EEZ), Marine Spatial Planning (MSP)

¶5 **Community-based monitoring** : Systematic observation of marine and coastal resources undertaken by resource-users or local institutions under agreed protocols, frequently alongside customary management arrangements. Distinguished from citizen science by its basis in local governance and resource rights rather than volunteer participation. See [TG-4.4 Citizen Science and Community-Based Monitoring](#). (GOAP Technical Guidance) : -> See also: Citizen science, Traditional knowledge, Administrative data

¶6 **Condition (ecosystem)** : See **Ecosystem condition**.

¶7 **Condition indicator** : A condition variable rescaled to a dimensionless 0–1 (or 0–100) scale relative to a reference condition value. See [TG-4.8 Physical Condition Measurement](#) and [TG-4.9 Biological Condition Measurement](#). (SEEA EA paras. 5.44–5.58) : -> See also: Condition variable, Reference condition, Ecosystem condition

¶8 **Condition variable** : The raw measured quantity, with its original units, that underlies a condition indicator (e.g. live coral cover in %, dissolved oxygen in mg/L). Distinguished from the rescaled condition indicator. See [TG-4.8 Physical Condition Measurement](#). (SEEA EA paras. 5.94–5.110) : -> See also: Condition indicator, Ecosystem Condition Typology (ECT)

¶9 **Confusion matrix** : A table comparing classified imagery or model output against ground-reference validation data, used to calculate accuracy metrics for ecosystem extent mapping. See [TG-4.1 Remote Sensing and Geospatial Data](#). (IPCC LULUCF good practice guidance) : -> See also: Accuracy assessment, Remote sensing

¶10 **Consumption of fixed capital** : The decline in the value of the stock of fixed assets used in production during the accounting period, as a result of physical deterioration, normal obsolescence or normal accidental damage. Conceptually equivalent to economic depreciation. It is distinguished from depletion, which applies to natural resources. (SNA) : -> See also: Depreciation, Depletion, Net Domestic Product (NDP)

¶11 **Cultivated biological resources** : Biological resources subject to direct control, responsibility and management by institutional units. In the ocean domain, this primarily refers to aquaculture. Growth is recorded as production, and the resources are classified as produced assets. (SNA 2025; SEEA CF para. 5.420)

D

¶1 **Data harmonisation** : The process of transforming data from different sources to common definitions, classifications, spatial units, and temporal references for integration into a coherent framework. See [TG-4.6 Data Harmonisation and Interoperability](#). (GSGF Principle 4) : -> See also: Interoperability, Metadata, Transboundary data

¶2 **Data pipeline to capital** : The conceptual pathway through which ocean account data flows from baseline asset valuation, through risk assessment and impact indicator generation, to investment decision-making and post-investment monitoring. (GOAP Technical Guidance)

¶3 **Data quality dimensions** : The six dimensions against which the SEEA EA assesses the quality of data entering environmental-economic accounts: relevance, timeliness, accuracy, coherence, interpretability and accessibility. Assessed per source and recorded in account metadata. See [TG-0.7 Quality Assurance Principles](#). (SEEA EA para. 2.86; UN NQAF) : -> See also: Quality assurance (QA), Validation, Uncertainty, Metadata

¶4 **Degradation (ecosystem)** : A decline in an ecosystem asset reflected in a decline in the condition of the ecosystem asset and an associated decline in the value of the asset. (SEEA EA)

¶5 **Depletion** : The decrease in the quantity of the stock of a natural resource over an accounting period due to extraction at a level greater than regeneration. (SEEA CF) : -> See also: Asset account, Stock, Flow, Degradation (ecosystem)

¶6 **Depreciation** : The decline in value of a fixed asset over an accounting period due to physical deterioration, obsolescence, or accidental damage. Also referred to as consumption of fixed capital (CFC) in the SNA. (SNA)

E

¶1 **Ecosystem** : A dynamic complex of plant, animal, and microorganism communities and their non-living environment interacting as a functional unit. (SEEA EA, following CBD) : -> See also: Ecosystem asset, Ecosystem service, Ecosystem type, Ecosystem condition, Ecosystem extent

¶2 **Ecosystem accounting** : An integrated statistical framework for organising data about habitats and landscapes, measuring the ecosystem services provided to the economy and human well-being, tracking changes in ecosystem assets, and linking this information with economic and other human activity. (SEEA EA para. 1.1)

¶3 **Ecosystem Accounting Area (EAA)** : The spatial boundary within which ecosystem accounts are compiled, defined by jurisdictional limits or ecological coherence. May be national, sub-national, or transboundary. (SEEA EA paras. 3.18-3.30) : -> See also: Basic Spatial Unit (BSU), Exclusive Economic Zone (EEZ), Sub-national accounting unit

¶4 **Ecosystem asset** : Contiguous spaces of a specific ecosystem type characterised by a distinct set of biotic and abiotic components and their interactions. (SEEA EA) : -> See also: Ecosystem, Ecosystem type, Ecosystem condition, Environmental asset, Individual environmental asset

¶5 **Ecosystem condition** : The quality of an ecosystem measured in terms of its abiotic and biotic characteristics (composition, structure and function), which underpins ecological integrity and capacity to supply ecosystem services. (SEEA EA) : -> See also: Ecosystem, Ecosystem asset, Ecosystem Condition Typology (ECT), Reference condition

¶6 **Ecosystem Condition Typology (ECT)** : A hierarchical classification of ecosystem condition variables into three groups (abiotic, biotic, and landscape characteristics) and six classes used in SEEA EA. (SEEA EA)

¶7 **Ecosystem extent** : The size of an ecosystem asset, measured in terms of area for each ecosystem type. (SEEA EA)

¶8 **Ecosystem service** : The contributions of ecosystems to the benefits that are used in economic and other human activity. See [TG-2.4 Environmental \(including Ecosystem\) Goods and Services](#).

(SEEA EA para. 6.4) : -> See also: Ecosystem, Final ecosystem service, Intermediate ecosystem service, Provisioning service, Regulating and maintenance service

¶9 **Ecosystem type** : A category in a classification of ecosystem assets based on similar ecological, biophysical, or functional characteristics. The Global Ecosystem Typology provides a standard classification. (SEEA EA) : -> See also: Ecosystem, Ecosystem asset, Global Ecosystem Typology (GET)

¶10 **Enhancement (ecosystem)** : An increase in an ecosystem asset reflected in an increase in the condition of the ecosystem asset and an associated increase in the value of the asset. (SEEA EA)

¶11 **Environmental asset** : The naturally occurring living and non-living components of the Earth, together constituting the biophysical environment, which may provide benefits to humanity. Classified into five sub-categories under SEEA CF para. 5.2: land, mineral and energy resources, biological resources, water resources, and other natural resources. Distinct from ecosystem assets, which are spatially defined areas measured under SEEA EA. (SEEA CF para. 5.1) : -> See also: Individual environmental asset, Ecosystem asset

¶12 **Environmental DNA (eDNA)** : Genetic material released into water, sediment, or other media by organisms present in or passing through an environment, sampled and analysed to detect species presence or estimate abundance. Applied in marine biodiversity monitoring and ecosystem condition assessment. (OBIS eDNA Guidelines) : -> See also: Biotic, Biodiversity, Ocean Biodiversity Information System (OBIS)

¶13 **Exclusive Economic Zone (EEZ)** : A sea zone over which a state has special rights regarding the exploration and use of marine resources, extending 200 nautical miles from the coast. (UNCLOS) : -> See also: Basic Spatial Unit (BSU), Marine Spatial Planning (MSP), Coastal zone

¶14 **Extent account** : An account that records the opening extent, changes during the accounting period, and closing extent of ecosystem assets by ecosystem type. (SEEA EA)

F

¶1 **FAIR principles** : Four principles for data management (Findable, Accessible, Interoperable, and Reusable), developed to enable research data discoverability and reuse. (Wilkinson et al., 2016) : -> See also: Data harmonisation, Interoperability, Metadata

¶2 **Final ecosystem service** : Those ecosystem contributions that are directly used, consumed or enjoyed by people and thus directly affect human wellbeing. Contrasted with intermediate ecosystem services. (SEEA EA paras. 6.11-6.17)

¶3 **Fishing effort** : A measure of the intensity of fishing activity, expressed in units such as vessel-days, fishing trips, hook-hours, or standardised fishing power. (FAO Guidelines for the Routine Collection of Capture Fishery Data) : -> See also: Maximum Sustainable Yield (MSY), Illegal, Unreported and Unregulated (IUU) fishing

¶4 **Flow** : A quantity measured over a period of time, such as production, income, or physical transfers. Contrasted with stocks. (SNA/SEEA) : -> See also: Stock, Asset account, Depletion

G

¶1 **Global Ecosystem Typology (GET)** : An international standard classification of ecosystem types developed by IUCN. It provides a framework for ecosystem accounting. (IUCN)

¶2 **Global Statistical Geospatial Framework (GSGF)** : A UN-GGIM endorsed framework providing five principles for integration of statistical and geospatial information at national and international levels. (UN-GGIM, GSGF v2.0) : -> See also: Integrated Geospatial Information Framework (IGIF), Interoperability, Metadata

¶3 **Governance** : The structures and processes by which societies share power and shape individual and collective actions, including formal and informal rules, rule-making systems, and actor-networks. See [TG-3.7 Governance Accounts](#). (IPBES)

¶4 **Governance effectiveness** : The degree to which governance arrangements achieve their intended management objectives, measured through indicators such as enforcement capacity, compliance rates, and stakeholder participation. See [TG-2.13 Governance and Institutional Indicators](#). (GOAP Technical Guidance, drawing on IUCN Green List Standard)

¶5 **Gross Domestic Product (GDP)** : The sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. (SNA)

¶6 **Gross Ecosystem Product (GEP)** : An aggregate monetary measure of the value of all final ecosystem services supplied by ecosystems within an accounting area over a defined period. Used as an ecosystem-accounting counterpart to GDP, and not part of the SNA core. (SEEA EA Chapter 9; GOAP Technical Guidance) : -> See also: Final ecosystem service, Valuation, Gross Domestic Product (GDP)

¶7 **Gross Value Added (GVA)** : See **Value added** (gross measure). (SNA)

¶8 **Ground reference data** : Independent observations of actual conditions at known locations, used to train and to test a classified geospatial product. Should be collected independently of the classification and sampled so that every mapped class is represented. See [TG-4.1 Remote Sensing and Geospatial Data](#). (ISO 19157; IPCC LULUCF good practice guidance) : -> See also: Accuracy assessment, Confusion matrix, Remote sensing, Validation

H

¶1 **Holistic dashboard** : An integrated presentation of ocean account indicators spanning environmental, economic, social, and governance domains. See [TG-3.8 Combined Presentations](#). (GOAP Technical Guidance)

I

¶1 **Illegal, Unreported and Unregulated (IUU) fishing** : Fishing activity that violates national or international regulations, occurs without reporting to management authorities, or takes place in areas or by vessels not authorised to fish. (FAO; SDG 14.6.1) : -> See also: Fishing effort, Vessel Monitoring System (VMS), Regional Fisheries Management Organisation (RFMO)

¶2 **Individual environmental asset** : Environmental assets as defined in the SEEA Central Framework, classified according to the SNA's five categories of natural resources. Contrasted with ecosystem assets. (SEEA CF)

¶3 **Integrated Coastal Zone Management (ICZM)** : A multisectoral approach to managing the land-sea interface that integrates terrestrial and marine resource management and addresses cumulative impacts of land-based activities on coastal and marine ecosystems. (UNESCO; EU ICZM Recommendation 2002/413/EC) : -> See also: Marine Spatial Planning (MSP), Coastal zone, Sustainable ocean planning

¶4 **Integrated Geospatial Information Framework (IGIF)** : The UN-GGIM framework for national geospatial information management, structured around nine strategic pathways spanning governance, policy, data, innovation and capacity. Its marine companion (IGIF-H) applies the framework to marine geospatial information, and provides the institutional reference for aligning ocean account spatial data with national geospatial infrastructure. See [TG-2.12 Spatial Data Frameworks](#). (UN-GGIM & World Bank, 2018, 2020) : -> See also: Global Statistical Geospatial Framework (GSGF), Interoperability, Metadata, Basic Spatial Unit (BSU)

¶5 **Intermediate ecosystem service** : Ecosystem contributions that support the functioning of ecosystems and the supply of final ecosystem services but are not directly used or consumed by people. (SEEA EA paras. 6.11-6.17)

¶6 **Interoperability** : The ability of data systems, tools, and standards to exchange and integrate information without loss of meaning, spanning technical, semantic, and organisational dimensions. See [TG-4.6 Data Harmonisation and Interoperability](#). (GSGF Principle 4) : -> See also: Data harmonisation, FAIR principles, Metadata

¶7 **Investment-readiness criteria** : A set of minimum requirements that ocean account-derived information must meet to support investment decision-making, including baseline data quality, time-series availability, spatial resolution, and institutional backing. (GOAP Technical Guidance)

L

¶1 **Livelihood dependency** : The reliance of populations or communities on ocean ecosystems for economic sustenance, food security, cultural identity, and wellbeing. See [TG-2.3 Livelihood Dependencies](#). (GOAP Technical Guidance) : -> See also: Adaptive capacity, Vulnerability, Subsistence harvesting

M

¶1 **Marine Protected Area (MPA)** : A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. See [TG-1.3 OA and Marine Spatial Management](#). (IUCN)

¶2 **Marine Spatial Planning (MSP)** : A public process of analysing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives. See [TG-1.2 OA and Marine Spatial Planning](#). (UNESCO-IOC) : -> See also: Marine Protected Area (MPA), Basic Spatial Unit (BSU), Exclusive Economic Zone (EEZ)

¶3 **Maximum Sustainable Yield (MSY)** : The largest average catch that can be taken from a fish stock under prevailing environmental conditions without compromising the stock's long-term productivity. See [TG-6.7 Fisheries Accounting: Integrating Stock Assessment](#). (FAO; UNCLOS Articles 61, 119) : -> See also: Fishing effort, Natural biological resources

¶4 **Medium-Term Expenditure Framework (MTEF)** : A budgeting approach that projects government revenues and expenditures over a 3-5 year planning horizon, integrating annual budgets within longer-term fiscal plans. See [TG-1.1 OA and National Budget Processes](#). (World Bank; IMF) : -> See also: Ocean accounts, National planning

¶5 **Metadata** : Structured information describing a dataset's content, quality, access conditions, lineage, and other properties. Required for fitness-for-purpose assessment when integrating diverse data into ocean accounts. See [TG-4.6 Data Harmonisation and Interoperability](#). (ISO 19115; UN NQAF) : -> See also: Data harmonisation, Interoperability, Quality assurance (QA)

¶6 **Modular data architecture** : A system design approach for ocean data infrastructure that allows components (data collection, storage, processing, dissemination) to be implemented incrementally and upgraded independently. (GOAP Technical Guidance)

N

¶1 **National planning** : The national development planning process – typically a multi-year national development plan with its sectoral strategies and monitoring framework – through which government priorities and resource allocations are set. Ocean accounts enter it as evidence for target-setting, sector prioritisation and progress reporting. See [TG-1.10 OA and National Planning](#)

Integration. (GOAP Technical Guidance) : -> See also: Medium-Term Expenditure Framework (MTEF), Sustainable ocean planning, Ocean accounts

¶2 **Natural biological resources** : Biological resources not subject to direct control, responsibility and management by institutional units. In the ocean domain, this includes wild fish stocks, classified as non-produced assets. (SNA/SEEA CF)

¶3 **Natural capital** : Natural resources and ecosystem assets. The 2025 SNA defines these as natural resources (mineral and energy resources, biological resources, water resources) and ecosystem assets (spatially defined areas measured through SEEA Ecosystem Accounting). Ecosystem assets are not explicitly recognised as economic assets in the national accounts. (SNA 2025 para. 35.24) : -> See also: Ocean accounts, Ocean economy, Blue economy, Environmental asset, Ecosystem asset

¶4 **Natural capital accounting (NCA)** : The application of accounting principles to measure, monitor, and report on natural capital stocks and flows over time. NCA encompasses individual environmental asset accounting (SEEA CF) and ecosystem accounting (SEEA EA). (SEEA; WAVES Partnership)

¶5 **Natural resource** : A component of the natural environment from which resource inputs and other flows are derived. (SEEA CF)

¶6 **Net Domestic Product (NDP)** : Gross Domestic Product less consumption of fixed capital. The 2025 SNA emphasises NDP as the conceptually preferred measure of economic performance, as it accounts for capital depreciation and resource depletion. (SNA 2025)

¶7 **Net ocean GVA** : Gross Value Added of the ocean economy adjusted to deduct consumption of fixed capital and the depletion of marine natural resources. A sustainability-adjusted measure of the ocean sector's contribution to national income. See TG-2.5 Structure and Function of the Ocean Economy. (GOAP Technical Guidance, applying SNA 2025 depletion treatment) : -> See also: Gross Value Added (GVA), Net Domestic Product (NDP), Depletion

O

¶1 **Ocean accounts** : A structured framework for compiling and integrating data about marine and coastal environments and their relationship with human societies and economies, compatible with international statistical standards (SNA and SEEA) and adhering to principles of official statistics. (GOAP) : -> See also: Ocean economy, Natural capital, Blue economy, SNA, SEEA

¶2 **Ocean Biodiversity Information System (OBIS)** : A global platform maintained by IOC-UNESCO that aggregates marine species occurrence records from distributed data providers. The primary international repository for biodiversity data used in ecosystem extent and condition accounting. (IOC-UNESCO) : -> See also: Environmental DNA (eDNA), Biodiversity, Metadata

¶3 **Ocean economy** : Economic activities that take place in the ocean, use the ocean as an input, or produce goods or services for ocean-related activities. See TG-2.5 Structure and Function of the Ocean Economy. (OECD, 2016) : -> See also: Ocean accounts, Blue economy, Natural capital, Gross Value Added (GVA)

P

¶1 **Parametric insurance** : Insurance products that trigger automatic payouts when a measured environmental parameter (e.g. sea surface temperature, wind speed, rainfall) crosses a pre-defined threshold, rather than requiring ex-post damage assessment. (Climate and disaster risk finance literature) : -> See also: Blue financial instruments, Blended finance

¶2 **Physical Supply and Use Table (PSUT)** : A table that records the supply and use of products and natural inputs in physical units, extending the monetary supply and use framework of the SNA. (SEEA CF)

¶3 **Produced asset** : A non-financial asset that has come into existence as a result of production. Includes fixed assets, inventories, and valuables. (SNA)

¶4 **Production boundary** : The boundary defining the scope of production in the national accounts. Activities within it are counted as production, whilst activities outside it are not. (SNA)

¶5 **Provisioning service** : Ecosystem contributions to the growth or development of biotic resources that may be harvested and used in production or directly consumed. (SEEA EA para. 6.21) : -> See also: Regulating and maintenance service, Final ecosystem service, Intermediate ecosystem service

Q

¶1 **Quality assurance (QA)** : Systematic procedures designed to prevent, identify, and address data quality issues across the statistical production cycle. QA addresses procedural design and governance, whilst quality control (QC) addresses implementation and detection of errors. See [TG-0.7 Quality Assurance Principles for the data-quality dimensions, documentation requirements and quality flags applied to ocean accounts](#). (UN NQAF Manual, 2019) : -> See also: Metadata, FAIR principles, Validation

R

¶1 **Reference condition** : A state against which ecosystem condition is measured, typically representing the natural or undegraded state of an ecosystem. SEEA EA recognises three approaches: (i) historical baselines drawn from long-term records, (ii) contemporary least-disturbed reference sites used as spatial analogues, and (iii) modelled potential condition under specified counterfactuals. Compilers should document the approach adopted. See [TG-4.8 Physical Condition Measurement](#). (SEEA EA paras. 5.36-5.43) : -> See also: Ecosystem condition, Condition indicator, Condition variable

¶2 **Regional Fisheries Management Organisation (RFMO)** : An international body established under UNCLOS to manage fish stocks (typically highly migratory or straddling stocks) in defined ocean regions. (UNCLOS Part VII; FAO) : -> See also: Fishing effort, Vessel Monitoring System (VMS), Transboundary data

¶3 **Regulating and maintenance service** : Ecosystem contributions that moderate or regulate the ambient environment, including physical, chemical, and biological conditions. Includes services such as coastal protection, climate regulation, and water purification. (SEEA EA paras. 6.22-6.30)

¶4 **Remote sensing** : The collection of information about objects or areas on Earth from a distance, typically via satellite or airborne sensors, without physical contact. A primary data source for ecosystem extent mapping and condition indicator derivation. See [TG-4.1 Remote Sensing and Geospatial Data](#). (SEEA EA Technical Guidance on Biophysical Modelling) : -> See also: Accuracy assessment, Confusion matrix, Bathymetry

¶5 **Residual** : Materials discarded by economic units after production or consumption. Includes solid waste, air emissions, water emissions, and other substances released to the environment. (SEEA CF)

¶6 **Resource rent** : The economic surplus arising from the use of a natural resource, calculated as gross revenue minus the costs of production including a normal return to produced capital and labour. The primary SEEA EA monetary valuation method for provisioning ecosystem services. See [TG-1.9 Safe Usage of Monetary Valuation](#). (SEEA EA Section 9.3) : -> See also: Valuation, Provisioning service, Depletion

S

- ¶1 **SEEA** : System of Environmental-Economic Accounting. Comprises the SEEA Central Framework (SEEA CF) and SEEA Ecosystem Accounting (SEEA EA). (UN) : -> See also: SNA, Ocean accounts, Environmental asset, Ecosystem accounting
- ¶2 **Service Benefiting Area (SBA)** : The spatial extent of populated or built-up land whose exposure to coastal hazards is materially reduced by ecosystem-based protection (e.g. coral reefs, mangroves, seagrass beds). Used in SEEA EA storm-mitigation service flow accounts to link supply to beneficiaries. (SEEA EA Chapter 7) : -> See also: Service Provisioning Area (SPA), Ecosystem service, Regulating and maintenance service
- ¶3 **Service Provisioning Area (SPA)** : The spatial extent of ecosystems supplying a particular service. Pairs with the Service Benefiting Area (SBA) in SEEA EA spatially explicit ecosystem service accounts. (SEEA EA Chapter 7) : -> See also: Service Benefiting Area (SBA), Ecosystem service
- ¶4 **SNA** : System of National Accounts. The international standard for measuring economic activity. The current version is the 2025 SNA. (UN) : -> See also: SEEA, Ocean accounts, Gross Domestic Product (GDP), Gross Value Added (GVA)
- ¶5 **Statistical Data and Metadata eXchange (SDMX)** : An international standard for the structure and exchange of statistical data and metadata, sponsored by UNSD, Eurostat, OECD, and others. (SDMX Technical Standards v3.0) : -> See also: Metadata, Interoperability, Transboundary data
- ¶6 **Stock** : A quantity measured at a point in time, such as asset holdings or population. Contrasted with flows. (SNA/SEEA) : -> See also: Flow, Asset account, Depletion
- ¶7 **Sub-national accounting unit** : A spatial unit for ocean accounting below the national level, such as a province, municipality, marine park, or coastal zone. See [TG-3.11 Sub-National Ocean Accounts](#). (GOAP Technical Guidance)
- ¶8 **Subsistence harvesting** : Non-commercial extraction of marine resources by households for direct own consumption. Typically unpaid and unrecorded in official fisheries statistics but within the SNA production boundary. (FAO SSF Guidelines; SEEA EA) : -> See also: Livelihood dependency, Production boundary, Provisioning service
- ¶9 **Supply and use table** : A table recording the supply of goods and services by domestic industries and imports, and their use by industries and final demand. (SNA)
- ¶10 **Sustainability** : The property of a system or process of being maintained over time without exhausting natural resources or causing severe ecological damage. Distinguished from **Sustainable development**, which describes development that achieves sustainability.
- ¶11 **Sustainable development** : Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. (Brundtland Commission, 1987)
- ¶12 **Sustainable ocean planning** : An integrated, whole-of-ocean approach in which a single national plan reconciles conservation, production and equity objectives across all ocean sectors. Broader in scope than marine spatial planning, which allocates space and activity within such a plan. See [TG-1.4 OA and Sustainable Ocean Planning](#). (Ocean Panel; GOAP Technical Guidance) : -> See also: Marine Spatial Planning (MSP), Integrated Coastal Zone Management (ICZM), National planning

T

- ¶1 **Taskforce on Nature-related Financial Disclosures (TNFD)** : An international standard-setting initiative that has developed a framework for organisations to report and act on nature-related dependencies, impacts, risks, and opportunities. (TNFD Recommendations, 2023) : -> See also: Investment-readiness criteria, Data pipeline to capital, Blue financial instruments
- ¶2 **Thematic account** : An account that focuses on a particular environmental or economic theme, such as energy, water, or the ocean. In Technical Guidance usage, 'thematic account' describes ac-

counts developed outside the SNA core framework to capture ocean-specific data, treated within the satellite accounts architecture of SNA 2025 Chapter 29. : -> See also: Ocean accounts, SEEA

¶3 **Tiered approach** : An incremental data-collection and measurement framework in which higher tiers provide greater accuracy at greater data and capacity cost. Tier 1 relies on global default datasets, Tier 2 uses national or regional data, and Tier 3 uses high-resolution direct measurement. (SEEA EA Technical Guidance; IPCC inventory guidelines) : -> See also: Data quality dimensions, Quality assurance (QA)

¶4 **Traditional knowledge** : Knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity. See TG-3.6 Traditional Knowledge. (CBD Art. 8(j))

¶5 : Note: IPBES uses the related term **Indigenous and Local Knowledge (ILK)** to encompass knowledge systems of indigenous peoples and local communities more broadly. Both terms appear in the Technical Guidance and should be treated as complementary.

¶6 **Transboundary data** : Information needed by one country for ocean accounting that is held or produced by another country. See TG-4.12 Transboundary Data. (GOAP Technical Guidance) : -> See also: Regional Fisheries Management Organisation (RFMO), Data harmonisation, Trust framework (for data sharing)

¶7 **Trust framework (for data sharing)** : Agreed principles, roles, and protocols governing data sharing between organisations for ocean accounting purposes. See TG-4.7 National Data Coordination Architectures. (GOAP Technical Guidance)

U

¶1 **Uncertainty** : The extent to which a reported value may depart from the true value, arising from measurement, sampling, modelling or assumption. The SEEA EA identifies four categories pertinent to ecosystem accounting: physical measurement, valuation, ecosystem dynamics, and future prices and values. Uncertainty is to be characterised and documented alongside the estimate, not suppressed. See TG-0.7 Quality Assurance Principles. (SEEA EA paras. 2.90–2.94) : -> See also: Data quality dimensions, Validation, Quality assurance (QA), Benefit transfer

V

¶1 **Validation** : Checking that a dataset, model or account is fit for its intended purpose by testing it against independent evidence – ground reference data, an alternative source, or expert review. Distinguished from verification, which checks only that a specified procedure was followed. Validation procedures for particular data sources are set out in the Section 4 circulars listed in TG-0.7 Quality Assurance Principles Section 3.9. (UN NQAF; ISO 19157) : -> See also: Quality assurance (QA), Accuracy assessment, Ground reference data, Uncertainty

¶2 **Valuation** : The process of assigning monetary values to assets or services. SEEA EA Chapter 9 recognises three primary categories: market-based methods, non-market revealed preference methods (e.g. hedonic pricing, travel cost), and non-market stated preference methods (e.g. contingent valuation). Compilers should apply methods consistently with the SEEA EA hierarchy and document the approach taken. See TG-1.9 Safe Usage of Monetary Valuation. (SEEA EA Chapter 9)

¶3 **Value added** : The value generated by production, measured as the value of output less the value of intermediate consumption. Recorded gross (before deducting consumption of fixed capital) as **Gross Value Added (GVA)**, or net (after deducting consumption of fixed capital) as **Net Value Added (NVA)**. (SNA) : -> See also: Gross Value Added (GVA), Net Domestic Product (NDP)

¶4 **Vessel Monitoring System (VMS)** : A satellite-based tracking system required by many fisheries management authorities for licensed fishing vessels above a specified size threshold. Transmits position and activity data at frequent intervals to fisheries authorities. See TG-4.3 Administrative Data

Sources. (FAO Voluntary Guidelines for Flag State Performance) : -> See also: Illegal, Unreported and Unregulated (IUU) fishing, Fishing effort, Administrative data

¶5 **Vulnerability** : The degree to which a population, sector, or system is susceptible to harm from ecosystem change or external shocks. Operationalised as a function of exposure, sensitivity, and adaptive capacity, with particular attention to groups dependent on marine resources. See [TG-2.9 Disaster Risk Indicators](#). (IPCC AR6; Sendai Framework for Disaster Risk Reduction) : -> See also: Adaptive capacity, Livelihood dependency

W

¶1 **Wellbeing** : A state of being that includes having basic material needs met, freedom and choice, health and bodily well-being, good social relations, security, peace of mind, and spiritual experience. See [TG-3.5 Social Accounts](#). (MEA, 2005)

¶2 : Note: IPBES uses the term 'good quality of life' in preference to 'wellbeing'. Where IPBES frameworks are cited in Technical Guidance circulars, use that term. (IPBES, 2015)

4. Sources and Abbreviations

Key Sources

- ¶1 **CBD**: Convention on Biological Diversity
- ¶2 **FAO**: Food and Agriculture Organization of the United Nations
- ¶3 **GOAP**: Global Ocean Accounts Partnership
- ¶4 **IPBES**: Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
- ¶5 **IPCC**: Intergovernmental Panel on Climate Change
- ¶6 **IUCN**: International Union for Conservation of Nature
- ¶7 **MEA**: Millennium Ecosystem Assessment (2005)
- ¶8 **OECD**: Organisation for Economic Co-operation and Development
- ¶9 **SEEA CF**: System of Environmental-Economic Accounting Central Framework (2012)
- ¶10 **SEEA EA**: System of Environmental-Economic Accounting Ecosystem Accounting (2021)
- ¶11 **SNA 2025**: System of National Accounts 2025
- ¶12 **UN**: United Nations
- ¶13 **UNCLOS**: United Nations Convention on the Law of the Sea
- ¶14 **UNESCO-IOC**: UNESCO Intergovernmental Oceanographic Commission
- ¶15 **World Bank, 2017**: *Toward a Blue Economy: A Promise for Sustainable Development*
- ¶16 **OECD, 2016**: *The Ocean Economy in 2030*
- ¶17 **IPCC AR6 Glossary, 2021**: IPCC Sixth Assessment Report Working Group I Glossary
- ¶18 **Kunming-Montreal GBF, 2022**: Kunming-Montreal Global Biodiversity Framework
- ¶19 **IPBES, 2015**: Diaz, S. et al. (2015). The IPBES Conceptual Framework – connecting nature and people. *Current Opinion in Environmental Sustainability* 14: 1-16.
- ¶20 **IPCC AR6**: IPCC Sixth Assessment Report (Working Groups I-III, 2021-2022).
- ¶21 **UN NQAF, 2019**: United Nations National Quality Assurance Framework Manual for Official Statistics.
- ¶22 **UN-GGIM**: United Nations Committee of Experts on Global Geospatial Information Management.
- ¶23 **GSGF**: Global Statistical Geospatial Framework (UN-GGIM, version 2.0).
- ¶24 **TNFD, 2023**: Taskforce on Nature-related Financial Disclosures, Recommendations of the Taskforce on Nature-related Financial Disclosures.
- ¶25 **OECD, 2018**: *Making Blended Finance Work for the Sustainable Development Goals*.

- ¶26 **Wilkinson et al., 2016:** The FAIR Guiding Principles for scientific data management and stewardship. *Scientific Data* 3: 160018.
- ¶27 **FAO SSF Guidelines:** Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (FAO, 2015).
- ¶28 **ISO 19115:** Geographic information – Metadata (International Organization for Standardization).
- ¶29 **SDMX:** Statistical Data and Metadata eXchange Technical Standards v3.0.
- ¶30 **BBNJ Agreement:** Agreement under UNCLOS on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction (adopted 2023).
- ¶31 **Sendai Framework:** Sendai Framework for Disaster Risk Reduction 2015–2030 (UN, 2015).

Standard Abbreviations Used in Technical Guidance

Abbreviation	Full Term
ABNJ	Areas Beyond National Jurisdiction
BBNJ	Agreement on Biodiversity Beyond National Jurisdiction
BSU	Basic Spatial Unit
CBD	Convention on Biological Diversity
CF	Central Framework (SEEA CF)
CICES	Common International Classification of Ecosystem Services
EA	Ecosystem Accounting (SEEA EA)
EAA	Ecosystem Accounting Area
ECT	Ecosystem Condition Typology
eDNA	Environmental DNA
EEZ	Exclusive Economic Zone
FAIR	Findable, Accessible, Interoperable, Reusable
GDP	Gross Domestic Product
GEP	Gross Ecosystem Product
GET	Global Ecosystem Typology
GSGF	Global Statistical Geospatial Framework
GVA	Gross Value Added
ICZM	Integrated Coastal Zone Management
IGIF	Integrated Geospatial Information Framework
IUU	Illegal, Unreported and Unregulated (fishing)
MPA	Marine Protected Area
MSP	Marine Spatial Planning
MSY	Maximum Sustainable Yield
MTEF	Medium-Term Expenditure Framework
NCA	Natural Capital Accounting
NDP	Net Domestic Product
NQAF	National Quality Assurance Framework (UN)
NSO	National Statistics Office
OA	Ocean Accounts
OBIS	Ocean Biodiversity Information System
PSUT	Physical Supply and Use Table

Abbreviation	Full Term
QA/QC	Quality Assurance / Quality Control
RFMO	Regional Fisheries Management Organisation
SBA	Service Benefiting Area
SDG	Sustainable Development Goal
SDMX	Statistical Data and Metadata eXchange
SEEA	System of Environmental-Economic Accounting
SF-MST	Statistical Framework for Measuring the Sustainability of Tourism
SNA	System of National Accounts
SPA	Service Provisioning Area
SUT	Supply and Use Table
TNFD	Taskforce on Nature-related Financial Disclosures
UNSC	United Nations Statistical Commission
VMS	Vessel Monitoring System

5. Acknowledgements

¶1 **Authors:** [To be confirmed]

DRAFT

Quality Assurance Principles

Explains the quality assurance principles that apply across all ocean accounting work, and how to document and review compiled accounts.

Version 0.7.1 **Status** Draft **Stability** Applied

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Drafting AI-assisted drafting from GOAP Secretariat source materials; source list to be published at the close of consultation.

OUTCOME

After reading this Circular, you will understand the quality assurance principles that apply across all ocean accounting work. These principles cover data quality dimensions, uncertainty categories, and documentation standards, and are referenced by all other circulars in the Technical Guidance.

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CONTENTS

1. Outcome	3
2. Requirements	3
3. Guidance Material	3
3.1 Purpose of Quality Assurance	3
3.2 Six Dimensions of Data Quality	3
3.3 Institutional Environment	5
3.4 Four Categories of Uncertainty	5
3.5 Documentation Requirements	6
3.6 Quality Flags for Accounts Tables	7
3.7 Quality Improvement Strategies	7
3.8 Tiered Implementation Frameworks	8
3.9 Circular-Specific QA Guidance	9
4. Acknowledgements	9
5. References	9
Footnotes	10

ABOUT THIS CIRCULAR

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DRAFT

1. Outcome

¶1 After reading this Circular, you will understand the quality assurance principles that apply across all ocean accounting work. These principles cover data quality dimensions, uncertainty categories, and documentation standards, and are referenced by all other circulars in the Technical Guidance.

2. Requirements

¶1 **Essential prerequisites:**

- ¶2 **TG-0.1 General Introduction to Ocean Accounts** – for the conceptual framework and the three-domain structure of Ocean Accounts

¶3 **Helpful background:**

- ¶4 **TG-0.2 Overview of Relevant Statistical Standards** – for the SEEA EA quality dimensions and statistical standards referenced throughout

3. Guidance Material

3.1 Purpose of Quality Assurance

¶1 Ocean accounts integrate data from diverse sources: environmental monitoring, economic statistics, social surveys, geospatial observations, and customary knowledge systems. Each source has different quality characteristics, and accounts compilation must address those differences systematically through the principles set out in this Circular.

3.2 Six Dimensions of Data Quality

¶1 The SEEA EA identifies six dimensions of data quality relevant to environmental-economic accounting, plus the quality of the institutional environment in which the data are compiled (para. 2.86; see Section 3.3). The six dimensions apply directly to ocean accounts:

3.2.1 Relevance

¶1 **Definition:** The degree to which the data serve to address the purposes for which they are sought by users.

¶2 **Ocean accounts considerations:**

- ¶3 Do the accounts address the policy questions being asked?
- ¶4 Are the spatial and temporal resolutions appropriate for the intended use?
- ¶5 Are the ecosystem types and economic sectors adequately disaggregated?

¶6 **Example:** An ocean account designed to inform marine spatial planning needs fine spatial resolution, whilst one supporting national budget processes may require less geographic detail but more reliable monetary estimates.

3.2.2 Timeliness

¶1 **Definition:** The length of time between the data reference period and availability of the information.

¶2 **Ocean accounts considerations:**

- ¶3 How current are the environmental monitoring data?
- ¶4 Are there lags between economic activity and its recording in accounts?

- ¶5 How frequently are accounts updated?

¶6 **Example:** Satellite-derived ecosystem extent data may be available within months, whilst large-scale economic surveys may have 1–2 year lags.

3.2.3 Accuracy

¶1 **Definition:** The degree to which the data correctly describe the phenomena they were designed to measure.

¶2 **Ocean accounts considerations:**

- ¶3 What are the measurement errors in environmental monitoring?
- ¶4 How reliable are sampling-based estimates of fish stocks or ecosystem condition?
- ¶5 What are the error margins for economic survey data?

¶6 **Example:** Fish stock assessments may have wide confidence intervals. Accounts should report those intervals alongside the point estimate.

3.2.4 Coherence

¶1 **Definition:** The degree to which data from different sources or compiled using different methods can be reliably combined and compared.

¶2 **Ocean accounts considerations:**

- ¶3 Are classifications consistently applied across data sources?
- ¶4 Are spatial boundaries aligned between environmental and economic data?
- ¶5 Are accounting periods synchronised?
- ¶6 Are changes in accounts over time attributable to genuine change rather than methodological or classification revisions? Breaks-in-series should be documented and, where feasible, back-casted (compilers should consult the relevant Section 3 accounts compilation circular for revisions practice specific to each account type).

¶7 **Example:** Economic data by industry may not align perfectly with spatially-defined ecosystem service flows, so bridging tables may be needed.

3.2.5 Interpretability

¶1 **Definition:** The availability of information to help users understand and properly use the data.

¶2 **Ocean accounts considerations:**

- ¶3 Are methods and assumptions clearly documented?
- ¶4 Are metadata standards applied?
- ¶5 Are definitions consistent with international standards?

¶6 **Example:** Accounts should specify how services were measured and which ecosystem service classification is used, for example CICES V5.2 or the SEEA EA Reference List of Ecosystem Services (see SEEA EA Annex 6.1). For SEEA EA accounts, the SEEA EA Reference List is the primary classification, and CICES V5.2 may be used as a complementary mapping.¹

3.2.6 Accessibility

¶1 **Definition:** The ease with which users can access and use the data.

¶2 **Ocean accounts considerations:**

- ¶3 Are accounts published in accessible formats?
- ¶4 Are underlying data available for users who need more detail?
- ¶5 Are there access restrictions (e.g., for confidential business data)?

¶6 **Example:** Accounts may be published in summary form with detailed underlying data available on request or through data portals.

3.3 Institutional Environment

¶1 Beyond the six dimensions of data quality, the SEEA EA emphasises the quality of the institutional environment in which data are compiled (para. 2.86), consistent with the UN Fundamental Principles of Official Statistics (Resolution 2013/21):

- ¶2 **Independence:** Statistical compilation free from political interference
- ¶3 **Mandate:** Clear legal or institutional authority for accounts production
- ¶4 **Resources:** Adequate funding and staffing
- ¶5 **Coordination:** Effective arrangements between data-producing agencies
- ¶6 **Standards:** Adherence to international statistical standards and principles

3.4 Four Categories of Uncertainty

¶1 The SEEA EA identifies four categories of uncertainty particularly pertinent to ecosystem accounting (paras. 2.90–2.94).² All apply directly to ocean accounts:

3.4.1 Physical Measurement Uncertainty

¶1 Uncertainty related to the physical measurement of ecosystem services and ecosystem assets.

¶2 **Sources in ocean accounts:**

- ¶3 Sampling variability in fish stock surveys
- ¶4 Remote sensing classification errors
- ¶5 Spatial interpolation between monitoring stations
- ¶6 Temporal variability between observations

¶7 **Approaches to address:**

- ¶8 Report confidence intervals where available
- ¶9 Document sampling design and coverage
- ¶10 Use ensemble methods or multiple data sources
- ¶11 Distinguish between measurement precision and accuracy

3.4.2 Valuation Uncertainty

¶1 Uncertainty in the valuation of ecosystem services and ecosystem assets.

¶2 **Sources in ocean accounts:**

- ¶3 Choice of valuation method (market prices, replacement cost, stated preference)
- ¶4 Benefit transfer from other contexts
- ¶5 Discount rate selection for asset values
- ¶6 Treatment of non-marginal changes

¶7 Benefit transfer introduces additional uncertainty where the study site and policy context differ substantially from the transfer site, so applicability conditions should be assessed and documented (see Section 3.5.4 Assumptions Made, and SEEA EA paras. 5.38–5.41).

¶8 **Approaches to address:**

- ¶9 Report physical accounts alongside monetary values
- ¶10 Use sensitivity analysis for key assumptions
- ¶11 Document valuation method selection rationale
- ¶12 Present ranges rather than point estimates for contested values

3.4.3 Ecosystem Dynamics Uncertainty

¶1 Uncertainty related to the dynamics of ecosystems and changes in flows.

¶2 **Sources in ocean accounts:**

- ¶3 Non-linear ecosystem responses to pressures
- ¶4 Threshold effects and regime shifts
- ¶5 Cumulative and synergistic impacts
- ¶6 Climate change effects on baselines

¶7 **Approaches to address:**

- ¶8 Use scenario analysis where trends are uncertain
- ¶9 Document known ecological thresholds
- ¶10 Update reference conditions as understanding improves
- ¶11 Link accounts to ecosystem monitoring programmes

3.4.4 Future Prices and Values Uncertainty

¶1 Uncertainty regarding future prices and values.

¶2 **Sources in ocean accounts:**

- ¶3 Future market conditions for ocean products
- ¶4 Changing social preferences for ecosystem services
- ¶5 Policy changes affecting resource access or use
- ¶6 Technological change affecting substitution possibilities

¶7 **Approaches to address:**

- ¶8 Use current prices for flow accounts
- ¶9 Apply sensitivity analysis for asset valuations
- ¶10 Document assumptions about future conditions
- ¶11 Update valuations periodically

3.5 Documentation Requirements

¶1 The SEEA EA closes its discussion of uncertainty by stating that all accounting work should document the scope of measurement, the definitions applied, the methods used, and the assumptions made (para. 2.95). Table 3.5.1 (below) maps these four documentation categories to the phases of the Generic Statistical Business Process Model (GSBPM v5.2).

Documentation category	GSBPM mapping	Key content
Scope of measurement	Phase 1 – Specify Needs	Geographic, temporal, thematic coverage; inclusions and exclusions
Definitions applied	Phase 2 – Design	Ecosystem type definitions; industry/product classifications; alignment with international standards
Methods used	Phase 5 – Process	Data sources; compilation procedures; valuation approaches; spatial analysis; gap-filling
Assumptions made	Phase 5 – Process	Key assumptions underlying estimates; sensitivity of results; known biases; expert judgement basis. Sensitivity analysis results: also Phase 8 – Evaluate

3.5.1 Scope of Measurement

- ¶1 Geographic coverage (EEZ, coastal zone, specific regions)
- ¶2 Temporal coverage (accounting period, time series extent)

- ¶3 Thematic coverage (ecosystem types, economic sectors, asset categories)
- ¶4 What is included and excluded, with rationale

3.5.2 Definitions Applied

- ¶1 Ecosystem type definitions and classification used
- ¶2 Industry and product classifications
- ¶3 Asset boundary definitions (e.g., treatment of aquaculture)
- ¶4 Alignment with international standards (or departures with justification)

3.5.3 Methods Used

- ¶1 Data sources and collection methods
- ¶2 Compilation procedures and algorithms
- ¶3 Valuation approaches (for monetary accounts)
- ¶4 Spatial analysis methods
- ¶5 Gap-filling and estimation procedures

3.5.4 Assumptions Made

- ¶1 Key assumptions underlying estimates
- ¶2 Sensitivity of results to assumption changes
- ¶3 Known biases and their direction
- ¶4 Expert judgement employed and its basis

3.6 Quality Flags for Accounts Tables

¶1 Table 3.6.1 sets out a recommended flagging system for ocean accounts tables.

Flag	Meaning	Description
A	High quality	Based on comprehensive data; low uncertainty
B	Acceptable quality	Based on representative data; moderate uncertainty
C	Use with caution	Limited data; significant uncertainty; may be revised
P	Provisional	Preliminary estimate; will be revised when data available
E	Estimated	Derived from models or benefit transfer; not direct measurement
X	Suppressed	Data withheld for confidentiality or quality reasons
n/a	Not applicable	Concept does not apply to this cell
..	Not available	Data not collected or not yet compiled

¶2 Note: the “n/a” symbol replaces the double-hyphen form used in some earlier drafts. The double hyphen (--) is reserved for em-dashes in circular prose.

¶3 When account aggregates are derived from cells carrying different flags, the aggregate should carry the flag of the lowest-quality input (e.g., an aggregate of A and C cells carries flag C). Where the lowest-quality input contributes less than 5% of the aggregate value, compilers may exercise judgement and document the rationale.

3.7 Quality Improvement Strategies

¶1 Table 3.7.1 summarises four complementary strategies for progressive improvement of ocean accounts over time.

Strategy	Key actions
Prioritised development	Focus initial efforts on highest-priority policy questions; accept provisional estimates where data are limited; build comprehensive accounts progressively.
User feedback	Engage data users in identifying quality priorities; track how accounts are used in decision-making; respond to user-identified gaps and issues.
Data source development	Work with data providers to improve underlying data; coordinate timing of surveys and monitoring; invest in new data collection where gaps are critical.
Method enhancement	Adopt improved methods as they become available; participate in international methodological development; share innovations with other countries.

3.7.1 Global Consultation on the Technical Guidance

¶1 The quality improvement strategies above apply to the ocean accounts that countries compile. The GOAP Technical Guidance itself is subject to an equivalent quality assurance process: each circular is developed and published through a structured Circular Review and Global Consultation that applies the same principles of transparency, attribution, and documentation set out in Section 3.5 to the guidance documents. A circular passes through five phases over approximately eleven weeks (Table 3.7.2).

Phase	Timing	Activities
1 – Draft	Weeks 1–3	A lead author prepares the draft and completes a self-check against the style guide and these quality assurance principles.
2 – Review	Weeks 4–5	A panel of three to five subject reviewers assesses the draft and produces a consolidated review summary.
3 – Comment	Weeks 6–8	The draft is published for open global consultation. Any reader may select a passage and submit a line-anchored comment, tagged by type, optionally proposing an alternative, and attributed to the contributor. Comments are debated through threaded replies with status tags within a time-boxed window, and the lead author responds. A decision gate then checks whether all comments are resolved: unresolved items return to the author, whilst resolved drafts pass to the Secretariat.
4 – Finalise	Weeks 9–10	The Secretariat adjudicates outstanding comments, finalises the text, and locks the version.
5 – Release	Week 11	Contributors are credited, the circular is published, and the comment record is archived.

¶2 Four roles carry the process: the lead author (drafts and responds to comments), the review panel (reviews and summarises), a moderator (routes comments and escalates unresolved items), and the Secretariat (adjudicates, finalises, and publishes). The consultation is conducted openly. Comments are publicly visible while the window is open, and the full comment record is retained as a public archive (logged to an annex of the circular). Escalations are logged, and any rejected suggestion is accompanied by a documented justification. Draft circulars open for consultation are presented with an inline commenting overlay that lets readers select text and submit feedback directly on the page (see, for example, the [TG-0.2 consultation page](#)).

3.8 Tiered Implementation Frameworks

¶1 Throughout the GOAP Technical Guidance, tiered implementation frameworks are used to indicate graduated approaches calibrated to available data and institutional capacity. Tier designations are circular-specific, as each circular defines the tiers appropriate to its subject matter. In all cases Tier 1 represents the minimum viable approach, whilst higher tiers represent more rigorous methods requiring greater capacity or data availability. Compilers should select the tier consistent with their data availability and intended account use, and may progress to higher tiers as capacity develops.

3.9 Circular-Specific QA Guidance

¶1 Table 3.9.1 maps circulars in Sections 3 and 4 to the quality assurance focus of their topic. TG-4.1 to TG-4.6 each include a section on data quality or quality assurance. TG-3.1 to TG-3.5 and TG-4.7 have no dedicated quality assurance section (TG-3.5 discusses uncertainties and risks in its Section 5); for these topics, the principles in this Circular apply directly.

Circular	QA focus
TG-3.1 Asset accounts	Stock measurements
TG-3.2 Flows from environment to economy	Ecosystem service flows
TG-3.3 Economic activity	Ocean economy statistics
TG-3.4 Flows from economy to environment	Pressure data
TG-3.5 Social accounts	Social indicators
TG-4.1 Remote sensing	Geospatial data
TG-4.2 Survey methods	Survey-based data
TG-4.3 Administrative data	Administrative sources
TG-4.4 Citizen science	Community-based monitoring data
TG-4.5 Research data	Integrating research data into official statistics
TG-4.6 Data harmonisation	Data harmonisation and interoperability
TG-4.7 Data coordination	National data coordination architectures

4. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

¶3 This circular draws on quality assurance frameworks from the SEEA EA (Chapter 2), the UN Fundamental Principles of Official Statistics, and the Generic Statistical Business Process Model (GSBPM).

5. References

- ¶1 United Nations. (2021). *System of Environmental-Economic Accounting – Ecosystem Accounting*, Chapter 2: Principles of ecosystem accounting. Paragraphs 2.86–2.95.
- ¶2 United Nations Economic and Social Council. (2013). Resolution 2013/21: Fundamental Principles of Official Statistics.
- ¶3 UNECE. (2025). *Generic Statistical Business Process Model (GSBPM)*, Version 5.2.
- ¶4 SEEA. (2022). *SEEA Ecosystem Accounting Glossary*.

FOOTNOTES

1. ¶1 CICES V5.2 is available at <https://cices.eu> (<https://cices.eu>). The SEEA EA Reference List of Ecosystem Services appears in SEEA EA Annex 6.1 and is the standard classification for SEEA ecosystem accounts.
2. ¶2 The four categories correspond to SEEA EA paras. 2.91 (physical measurement), 2.92 (valuation), 2.93 (ecosystem dynamics), and 2.94 (future prices and values) respectively.

DRAFT

Implementation Readiness Assessment

Provides a country readiness self-assessment framework for launching or scaling ocean accounts.

Version 0.9.2

Status Draft

Stability Applied

Last updated September 2026 **Responsible officer** Dr Jordan Gacutan

Drafting AI-assisted drafting from GOAP Secretariat source materials; source list to be published at the close of consultation.

OUTCOME

This Circular provides a country readiness self-assessment framework for launching or scaling ocean accounts. It guides countries through evaluating their institutional, data, and human capacity prerequisites, and outlines phased implementation pathways appropriate to different starting conditions. After reading this Circular, national statistical offices, ocean agencies, and inter-ministerial coordination bodies will be able to diagnose their current readiness level, identify priority gaps, design a sequenced implementation plan, and mobilise the institutional arrangements necessary to sustain ocean accounting as a regular statistical programme.

The Circular covers four further aspects of standing up and sustaining a programme. Section 3.5 is normative for the publication on coordination arrangements: where the mandate sits, what instrument carries it, how the arrangement is reviewed, and how political, technical and institutional champions are cultivated and sustained. Section 3.7 sets out the scoping phase that precedes Phase 1, drawing on the ESCAP pilot programme, and how to prioritise account types when capacity allows only one or two. Section 3.8 consolidates investment readiness for ocean finance – the minimum evidence a proposal needs, a scoring rubric, shared investment criteria, and the institutional and data requirements behind them. Section 3.9 covers regional platforms, peer exchange and South-South cooperation.

How account outputs then reach the planning cycle is [TG-1.10 OA and National Planning Integration](#); the operational design of data-coordination committees is [TG-4.7 National Data Coordination Architectures](#).

CONTENTS

1. Outcome	3
2. Requirements	3
3. Guidance Material	3
3.1 Country Readiness Self-Assessment Framework	3
3.2 Phased Implementation Pathway	6
3.3 Implementation Requirements Matrix	9
3.4 Human Capacity Requirements and Team Composition	12
3.5 Institutional Arrangements for Implementation	14
3.6 Country Commitment Framework	20
3.7 Scoping and Pilot Implementation: Experience from the ESCAP Programme	21
3.8 Investment Readiness for Ocean Finance	23
3.9 Peer Exchange, Regional Platforms and South-South Cooperation	26
4. Limitations and Considerations	28
4.1 Context sensitivity	28
4.2 Assessment subjectivity	28
4.3 Dynamic nature of readiness	29
5. Acknowledgements	29
6. References and Notes	29

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DRAFT

1. Outcome

¶1 This Circular provides a country readiness self-assessment framework for launching or scaling ocean accounts. It guides countries through evaluating their institutional, data, and human capacity prerequisites, and outlines phased implementation pathways appropriate to different starting conditions. After reading this Circular, national statistical offices, ocean agencies, and inter-ministerial coordination bodies will be able to diagnose their current readiness level, identify priority gaps, design a sequenced implementation plan, and mobilise the institutional arrangements necessary to sustain ocean accounting as a regular statistical programme.

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¶3 How account outputs then reach the planning cycle is **TG-1.10 OA and National Planning Integration**; the operational design of data-coordination committees is **TG-4.7 National Data Coordination Architectures**.

2. Requirements

¶1 **Essential prerequisites:**

- ¶2 **TG-0.1 General Introduction to Ocean Accounts** – for the conceptual framework and the nested superset structure of economy, society, and environment

¶3 **Helpful background:**

- ¶4 **TG-0.4 Structure and Focus** – for the overall structure of the Technical Guidance and dependency relationships between circulars
- ¶5 **TG-0.5 Navigating the Technical Guidance** – for audience pathways that help prioritise which accounts to compile first

¶6 ⓘ Framework Position

¶7 This Circular sits at the start of any country's implementation. It evaluates readiness across institutional capacity, data infrastructure, human skills, and policy demand: the four pillars that determine whether a country can sustain ocean accounting as a regular statistical programme. The assessment informs the choice of implementation pathway and connects to **TG-4.7 Data Coordination** for institutional architecture and **TG-3.11 Sub-National Ocean Accounts** for multi-level implementation.

3. Guidance Material

3.1 Country Readiness Self-Assessment Framework

3.1.1 Assessment dimensions

¶1 The readiness assessment covers four dimensions. Legal and regulatory environment is embedded as a sub-dimension of institutional capacity, because legal barriers to data sharing operate differently from coordination weakness and must be diagnosed separately:

Dimension	Description	Key questions
Institutional capacity	<i>Legal and regulatory environment</i> (statutes governing data sharing, statistics-act provisions, agency-specific data-access laws); inter-agency coordination mechanisms; political commitment; and resource allocation	Is there a lead agency with a clear legal mandate? Do statistics-act or agency-specific laws permit the necessary data sharing? Are ocean accounting data-sharing agreements in place? Is ocean accounting embedded in national statistical plans?
Data infrastructure	Availability, accessibility, and quality of environmental, economic, and social data relevant to ocean accounting	What ocean-related data exist? Are they accessible in machine-readable formats? Do spatial and temporal coverages meet minimum requirements?
Human skills and knowledge	Technical expertise in statistical compilation, environmental science, economic accounting, and geospatial analysis	Are there staff with SEEA compilation experience? Is there familiarity with ecosystem classification and condition assessment? Are GIS capabilities available?
Policy demand and use	Existence of policy frameworks, planning processes, and reporting commitments that create demand for ocean account outputs	Are there national ocean or blue economy strategies? Does the country report on SDG 14? Are there active marine spatial planning processes?

3.1.2 Readiness scoring rubric

¶1 Each dimension is scored on a four-level maturity scale aligned to SEEA implementation progression. The levels are cumulative: achieving a higher level implies that the requirements of lower levels have also been met. Where sub-element profiles are mixed, score to the highest level for which all criteria are met and record partial achievement of higher-level criteria as evidence for gap analysis in Section 3.1.3 Step 3.¹

Level	Label	General description
1	Pre-pilot	Ad hoc or absent. No SEEA accounts compiled. Activities depend on individual initiative or project-based funding.
2	Pilot compilation	At least one account type has been trialed. Some foundational elements in place. Formal arrangements are emerging but not yet institutionalised.
3	Regular compilation	Regular compilation of at least one account type is integrated into national reporting. Systematic arrangements are operational, though coverage or quality may be incomplete.
4	Multi-account with iterative improvement	Multi-account compilation is underway with continuous improvement processes embedded. Outputs are integrated into decision-making.

¶2 Institutional capacity scoring:

Level	Criteria
1 – Pre-pilot	No designated lead agency. Ocean accounting is not referenced in national statistical plans. Inter-agency coordination for ocean data is informal or absent. No data-sharing legal basis identified.
2 – Pilot compilation	A lead agency has been identified (NSO, ocean ministry, or environment agency). Initial discussions on inter-agency coordination have occurred. Ocean accounting is referenced in at least one national strategy or plan. Legal basis for key data-sharing steps has been assessed.
3 – Regular compilation	A formal inter-agency coordination mechanism (committee, working group, or MoU network) is operational. The lead agency has allocated recurrent budget for ocean accounting. Data-sharing agreements cover at least the core data providers. Statistics-act provisions and inter-agency legal authority for data access are documented.

Level	Criteria
4 – Multi-account with iterative improvement	Ocean accounting is embedded in the National Strategy for the Development of Statistics (NSDS) or equivalent. The coordination mechanism has a formal mandate and meets regularly. Production is funded through recurrent budget lines. Quality assurance procedures are documented and applied.

¶3 Data infrastructure scoring:

Level	Criteria
1 – Pre-pilot	Key datasets (marine area delineation, fisheries production, coastal land use) are unavailable or inaccessible. No data inventory for ocean-relevant holdings has been conducted.
2 – Pilot compilation	A data inventory has been completed identifying available ocean-relevant datasets. Some key datasets are accessible but may lack spatial referencing, consistent time series, or documentation. Global or regional datasets are used to fill gaps.
3 – Regular compilation	Core datasets for at least one account type (e.g., extent, economic flows) are available with adequate spatial and temporal coverage. A common spatial framework (e.g., ecosystem accounting areas, statistical geography) is defined. Metadata standards are applied.
4 – Multi-account with iterative improvement	Comprehensive data holdings support multiple account types. Data pipelines are automated or semi-automated. Data quality is regularly assessed against documented standards. New data sources (remote sensing, citizen science, administrative records) are actively integrated.

¶4 Human skills scoring:

Level	Criteria
1 – Pre-pilot	No staff have received training in environmental-economic accounting or SEEA methods. Relevant expertise (ecology, marine science, economic statistics, GIS) exists in separate agencies but has not been mobilised for ocean accounting.
2 – Pilot compilation	At least one staff member has received SEEA or ocean accounting training. A skills gap analysis has been conducted. Expertise in relevant disciplines has been identified across agencies.
3 – Regular compilation	A core team (3–5 staff) has practical experience in compiling at least one type of ocean account. The team includes or has access to expertise in ecological classification, economic accounting, and geospatial analysis. Training plans are in place.
4 – Multi-account with iterative improvement	A multi-disciplinary team is in place with documented skills across all required domains. Staff participate in international peer networks. Knowledge management systems (documentation, handover procedures, training curricula) ensure institutional memory.

¶5 Policy demand scoring:

Level	Criteria
1 – Pre-pilot	No explicit policy demand for ocean accounts. Ocean governance relies on sector-specific data without integration across domains.
2 – Pilot compilation	At least one policy process (national ocean strategy, marine spatial plan, SDG reporting) has identified ocean accounts as a potential input. Initial engagement with policy users has occurred.
3 – Regular compilation	Ocean account outputs are referenced in at least one active policy process. Regular dialogue between account compilers and policy users is established. Indicator needs have been specified.

Level	Criteria
4 – Multi-account with iterative improvement	Ocean accounts are routinely used in multiple policy processes (budgeting, spatial planning, international reporting). Feedback loops between users and producers are formalised. Account outputs are cited in policy documents.

3.1.3 Conducting the assessment

¶1 The self-assessment should be conducted by a small team that includes representatives from the national statistical office, the lead ocean or environment agency, at least one major data provider, and where possible a policy user from a planning or finance ministry. The assessment can be completed in a structured workshop of one to two days, following these steps:

1. ¶2 **Preparation:** Assemble background documentation including the national statistical plan, any existing data inventories, relevant policy documents, and organisational charts showing institutional responsibilities for ocean-related data.
 2. ¶3 **Scoring:** Work through each dimension and score against the rubric. Document the evidence supporting each score and note any uncertainties.
 3. ¶4 **Gap identification:** For each dimension where the score falls below the target level for the intended implementation pathway (Section 3.2), identify specific gaps and their causes. Where sub-element profiles are mixed, record the partial achievement as evidence for the gap analysis.
 4. ¶5 **Priority setting:** Rank gaps by their impact on the chosen pathway and the feasibility of addressing them. Use the requirements matrix in Section 3.3 to map gaps to specific account types.
 5. ¶6 **Action planning:** Develop a time-bound action plan to address priority gaps, assigning responsibilities and identifying resource requirements.
 6. ¶7 **External review (Recommended):** Share the completed assessment with a peer country, regional statistical body, or GOAP technical assistance team. External review is particularly valuable where self-assessment scores fall at level boundaries or where institutional capacity constraints make objective scoring difficult.
- ¶8 Countries are encouraged to share their assessments through the GOAP network to support peer learning.

3.2 Phased Implementation Pathway

3.2.1 Three-phase pathway

¶1 The following three-phase pathway is recommended as a general model. Countries should adapt it to their specific circumstances. The phases are not rigidly sequential, and countries may pursue elements of later phases in parallel where capacity permits. Figure 0.8.1 illustrates how a country's SNA and spatial capacity profile routes it to an entry point, and how the phase at which it starts the Foundation–Expansion–Integration pathway is set separately by its overall readiness level.

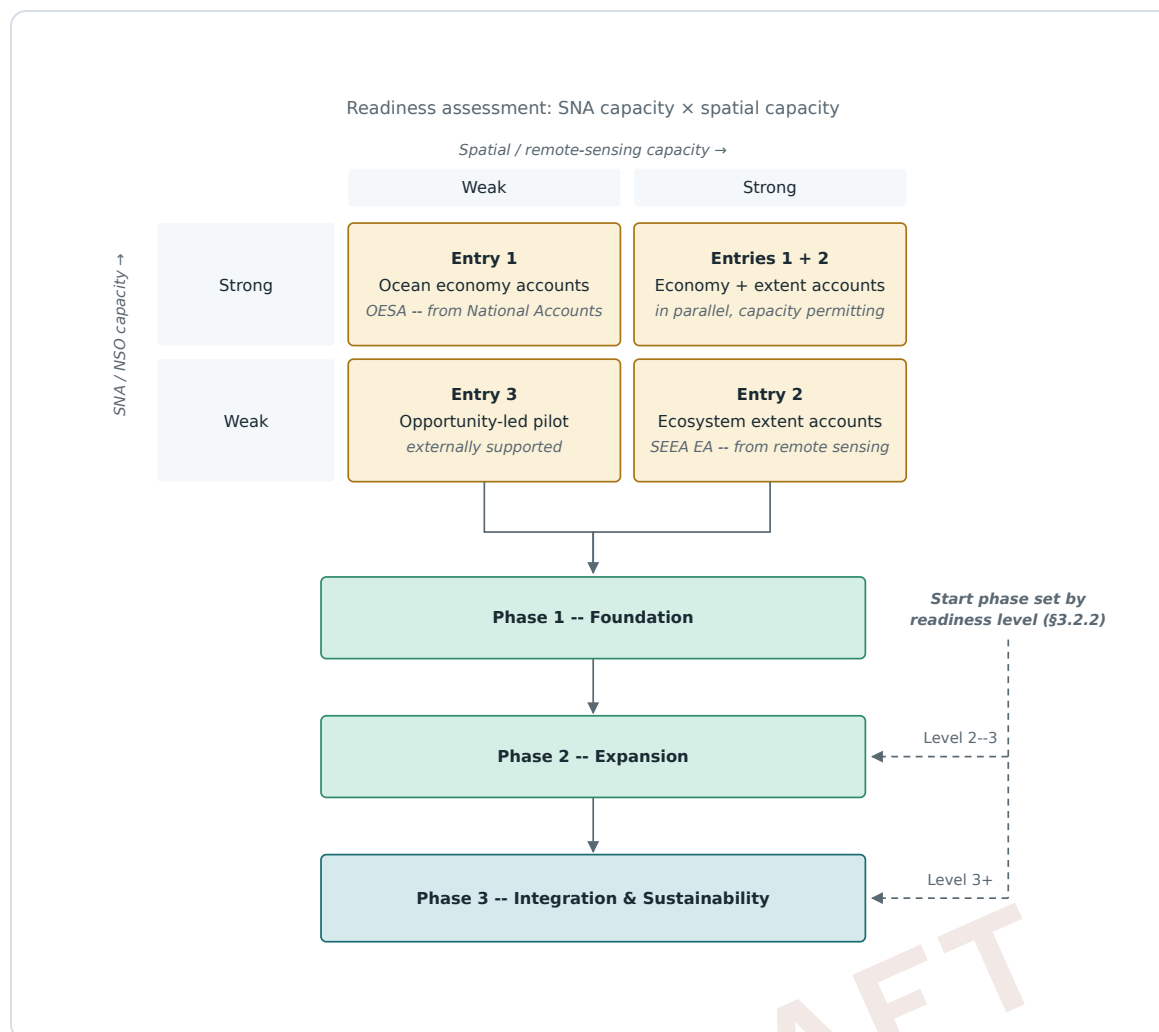


Figure 0.8.1 A 2×2 of SNA/NSO against spatial capacity routes each profile to an entry point, not a pathway phase. [a] High SNA/NSO capacity favours ocean economy accounts first. [b] High spatial capacity favours ecosystem extent. All entry points begin in Phase 1.

Source: TG-0.8 §3.1 (Readiness self-assessment), §3.2 (Phased implementation pathway, Table 3.2.1 entry-point matrix).

Adapted from: SEEA EA 2024 Quality Assurance Framework Annex A (capacity diagnostics); TG-0.7 §4 (QA principles for staged adoption).

¶2 Phase 1: Foundation

¶3 Key activities:

- ¶4 **Institutional setup:** Identify and formalise the lead agency. Establish an inter-agency coordination mechanism (see Section 3.5). Secure initial funding, which may combine government budget with international technical assistance.
- ¶5 **Data inventory and gap analysis:** Conduct a full inventory of ocean-relevant data holdings across government agencies, research institutions, and international sources. Assess data quality, spatial coverage, temporal frequency, and accessibility.
- ¶6 **Spatial framework:** Define the ecosystem accounting area(s) and establish a common spatial framework aligned with the GSGF principles on common geographies and geocoding.²
- ¶7 **Initial accounts – three entry-point pathways:** Compile at least one type of account to demonstrate feasibility and generate initial policy-relevant outputs:

Entry point 1 – SEEA CF / Ocean Economy Satellite Accounting (OESA): Recommended where a country has strong SNA infrastructure and an active NSO. OESA, which disaggregates ocean-related components from the National Accounts, is typically the first deliverable. Fisheries, maritime transport, and coastal tourism accounts are typical starting products.

Entry point 2 – SEEA EA extent accounts: Recommended where a country has strong spatial data infrastructure (remote sensing, marine surveys, habitat mapping programmes) but weaker SNA capacity. Ecosystem extent accounts for one or two marine or coastal ecosystem types can be compiled largely from remote sensing data and can be led by an environment agency without full SNA alignment.

Entry point 3 – Opportunity-led pilot (externally supported): Recommended where both SNA and spatial capacity are limited. Start with whichever account type has the strongest existing data champion and the clearest near-term policy use. Externally led pilots are a recognised entry pathway, often preceding government internalisation of the programme (Trueb et al., 2024).³

SNA / NSO strong?	Spatial / RS strong?	Recommended entry point
Yes	Yes	Entry points 1 and 2, in parallel or in close sequence subject to team capacity (see Section 3.4.1)
Yes	No	Entry point 1 (SEEA CF / OESA)
No	Yes	Entry point 2 (SEEA EA extent)
No	No	Entry point 3 (Opportunity-led pilot)

¶8

Stakeholder engagement: Present initial results to policy users to test relevance, build demand, and refine the work programme for Phase 2.

¶9 Phase 2: Expansion

¶10 Phase 2 begins at Phase 1 completion, with elements that may be initiated in parallel where capacity permits. Key activities:

- ¶11 **Additional account types:** Extend to ecosystem condition accounts, physical ecosystem service flow accounts, and asset accounts. The sequence should be guided by policy demand and data availability, drawing on the requirements matrix in Section 3.3.
- ¶12 **Monetary valuation:** Initiate monetary valuation of ecosystem services where appropriate, beginning with services where market-based methods can be applied.
- ¶13 **Indicator derivation:** Develop indicators from the accounts in consultation with policy users.
- ¶14 **Institutional consolidation:** Formalise data-sharing agreements. Integrate ocean accounting into the NSDS or equivalent. Establish quality assurance procedures aligned with TG-0.7.

¶15 Phase 3: Integration and sustainability (ongoing)

¶16 Key activities:

- ¶17 **Regular production:** Establish a regular production cycle for priority accounts, typically aligned with national accounts periodicity. Develop standard operating procedures, compilation guides, and automated data pipelines.
- ¶18 **Full account suite:** Work toward complete coverage of the Ocean Accounts Framework, including combined presentations (see TG-3.8) and sub-national accounts where policy demand exists (see TG-3.11).
- ¶19 **Policy integration:** Embed account outputs in budget processes (TG-1.1), marine spatial planning, environmental impact assessment (TG-1.6), national development plans (TG-1.10), and international reporting commitments.

- ¶20 **Continuous improvement:** Conduct regular readiness reassessments. Participate in international technical networks and contribute to global standards development.

3.2.2 Aligning the pathway with readiness levels

Overall readiness profile	Recommended entry point
Predominantly Pre-pilot (Level 1) across dimensions	Begin with Phase 1 institutional setup and data inventory. Focus on a single pilot account.
Mixed Pre-pilot / Pilot compilation (Levels 1–2) with at least one dimension at Pilot compilation	Enter Phase 1, building on existing strengths as the starting point for initial account compilation.
Predominantly Pilot compilation (Level 2) with some Regular compilation (Level 3)	Begin Phase 2 activities in areas of strength whilst completing Phase 1 requirements in others.
Predominantly Regular compilation (Level 3) or higher	Focus on Phase 3 integration and sustainability. Expand account coverage and deepen policy use.

¶1 Countries with existing SEEA implementation experience for land, water, energy, or forest accounts will often find that their readiness levels are higher across multiple dimensions. Institutional arrangements, data infrastructure, and human skills developed for those accounts are substantially transferable to ocean accounting.

3.3 Implementation Requirements Matrix

¶1 The matrix below maps institutional capacity, data infrastructure, and human skills needed across major ocean account types. Reading down a column identifies the full set of prerequisites for a particular account type. Reading across a row indicates how requirements scale across types for planning purposes.

3.3.1 Institutional capacity requirements

¶1 Lead-agency entries in the first row are illustrative, whilst country governance choices in Section 3.5.2 take precedence.

Requirement	Ocean economic accounts	Ecosystem extent accounts	Ecosystem condition accounts	Ecosystem service flow accounts	Ecosystem set accounts
Lead agency identified	Illustrative: NSO national accounts division	Illustrative: environment or geospatial agency	Illustrative: environment agency with research-institution support	Illustrative: NSO with environment agency	Illustrative: NSO with environment agency
Inter-agency coordination	NSO + fisheries/maritime agencies (pilot-compilation level coordination)	Environment agency + geospatial agency + marine research (pilot-compilation level)	Environment agency + multiple research institutions + monitoring agencies (regular-compilation level)	NSO + environment + sectoral agencies (fisheries, tourism, water) (regular-compilation level)	All of the above (regular-compilation level)

Requirement	Ocean economic accounts	Ecosystem extent accounts	Ecosystem condition accounts	Ecosystem service flow accounts	Ecosystem asset accounts
Data-sharing agreements	Standard statistical data sharing	Geospatial data licensing + research data access	Research data sharing + monitoring network agreements	Cross-domain agreements spanning environment and economic agencies	Comprehensive agreements covering all data sources
Budget commitment	Low (marginal if SNA infrastructure exists; moderate otherwise)	Moderate: geospatial data acquisition, mapping	Moderate to high: field monitoring, laboratory analysis	Moderate: modelling, valuation expertise	Moderate: builds on service flow and condition accounts
Legal/mandate basis	Statistics Act (typically sufficient)	Environmental legislation + statistics mandate	Environmental monitoring legislation	Cross-cutting mandate desirable	Cross-cutting mandate desirable

¶12 The lead agency should have both the institutional authority to convene data-contributing agencies and a clear mandate to manage or report on the relevant resource or ecosystem. Where no single agency holds both, a joint coordination mechanism is appropriate (see Section 3.5.2).

3.3.2 Data infrastructure requirements

Requirement	Ocean economic accounts	Ecosystem extent accounts	Ecosystem condition accounts	Ecosystem service flow accounts	Ecosystem asset accounts	Sociogovernance accounts
Spatial framework	Administrative boundaries; port/coastal zone delineation	Ecosystem type map aligned with IUCN GET level 3 (Ecosystem Functional Group) or equivalent national typology ⁴	Same as extent + monitoring site locations	Same as extent + user locations (households, industries)	Same as extent, condition, and services	Administrative + core boundaries
Core datasets	National accounts (Supply-Use Tables (SUT), GDP by industry); business register; trade statistics; fisheries production	Satellite imagery (Landsat, Sentinel); habitat maps; bathymetry; land cover	Water quality; biodiversity surveys; physical oceanography; benthic monitoring	Fisheries catch; coastal protection models; recreation surveys; carbon flux data	Service projections; discount rates; NPV inputs ⁵	Governance indicators; compliance; surveillance; records
Temporal requirements	Annual (aligned with national accounts cycle)	Multi-year baseline + periodic update (3–5 years)	Annual or sub-annual for key indicators	Annual (aligned with national accounts)	Annual or aligned with condition assessment cycle	Periodic or annual, typical

Requirement	Ocean economic accounts	Ecosystem extent accounts	Ecosystem condition accounts	Ecosystem service flow accounts	Ecosystem asset accounts	Societal governance accounts
Quality standards	SNA compilation standards; UN-NQAF	Accuracy assessment of classification; positional accuracy of maps	Measurement uncertainty quantification; inter-calibration of monitoring networks	Model validation; sensitivity analysis	Propagation of uncertainty from underlying accounts (see SEEA EA paras. 11.116–11.135 and TG-1.9 for Monte Carlo and sensitivity-analysis approaches)	Survey method standards
Metadata requirements	SDMX-compliant metadata	ISO 19115 geospatial metadata; lineage documentation	Measurement protocols; QA/QC records	Model documentation; assumption registers	Valuation methodology documentation	Survey method sampling design

3.3.3 Human skills requirements

Skill domain	Ocean economic accounts	Ecosystem extent accounts	Ecosystem condition accounts	Ecosystem service flow accounts	Ecosystem asset accounts	Social and governance accounts
National accounting	Essential: SNA compilation, industry classification (ISIC)	Useful for integration with economic data	Useful for integration with economic data	Essential: supply-use framework, linking ecosystem services to industries	Essential: asset valuation, NPV methods, balance sheets	Useful for linking social data to SNA framework
Environmental science	Useful for defining ocean economy boundaries	Essential: ecology, remote sensing, ecosystem classification (IUCN GET)	Essential: marine ecology, water chemistry, biodiversity assessment	Essential: ecosystem service modelling, biophysical quantification	Essential: understanding ecosystem dynamics and sustainability thresholds	Useful for understanding environmental context
Geospatial analysis	Moderate: spatial delineation of coastal zones	Essential: GIS, remote sensing, spatial analysis	Essential: spatial interpolation, monitoring network design	Essential: spatial modelling of service flows and use	Essential: spatially explicit valuation	Moderate: mapping governance jurisdictions
Statistical methods	Essential: sampling, estimation, seasonal adjustment	Moderate: accuracy assessment, area estimation	Moderate to high: index construction, composite indicators	High: modelling, uncertainty analysis	High: discounting, time series, sensitivity analysis	Essential: survey design, social statistics

Skill domain	Ocean eco-economic accounts	Ecosystem extent accounts	Ecosystem condition accounts	Ecosystem service flow accounts	Ecosystem asset accounts	Social and governance accounts
Monetary valuation	Not required (market data used directly)	Not required for physical accounts; useful for downstream monetary integration	Not required for physical accounts; useful for downstream monetary integration	Required for monetary accounts: market price methods, replacement cost, avoided damage cost	Essential: NPV, discount rate selection, welfare economics	Not typically required
Data management	Essential: database management, data integration	Essential: geospatial databases, raster/vector data management	Essential: time series databases, monitoring data management	Essential: multi-source data integration	Essential: all of the above	Essential: survey data management, confidentiality

3.3.4 Using the requirements matrix

1. ¶1 **Identify target accounts:** Based on the implementation pathway (Section 3.2) and policy priorities, identify which account types will be compiled in each phase.
2. ¶2 **Read requirements:** For each target account type, read down the relevant column across all three requirement tables to identify the full set of prerequisites.
3. ¶3 **Compare to readiness assessment:** Map identified requirements against the country's current readiness levels. Where requirements exceed current capacity, these represent gaps to be addressed.
4. ¶4 **Sequence investment:** Prioritise requirements shared across multiple account types (e.g., spatial framework, inter-agency coordination) as foundational investments that enable multiple downstream products.

¶5 Requirements become progressively more demanding moving left to right across the matrix. Ocean economic accounts build substantially on existing SNA infrastructure. Ecosystem accounts require environmental science and geospatial capabilities. Social and governance accounts add survey and community engagement capabilities.

3.4 Human Capacity Requirements and Team Composition

3.4.1 Core team structure

¶1 Sustained ocean accounting requires a dedicated core team combining expertise across multiple disciplines. The following structure provides a general model for countries at Phase 2 or later:

Role	Key responsibilities	Typical background	FTE allocation
Programme coordinator	Overall management; inter-agency liaison; stakeholder engagement; quality assurance	Senior statistician or environmental economist with management experience	0.5–1.0 (the 0.5 lower bound applies only where the coordinator has dedicated administrative support; otherwise 0.75 minimum for Phase 1)

Role	Key responsibilities	Typical background	FTE allocation
Economic accountant	Ocean economy satellite accounts; SNA-SEEA linkages; monetary ecosystem service accounts	National accounts compilation; economic statistics	0.5–1.0
Environmental scientist	Ecosystem classification; condition assessment; ecosystem service quantification	Marine ecology, environmental science, or conservation biology	0.5–1.0
Geospatial analyst	Spatial framework management; remote sensing; map production; spatial data integration	GIS, remote sensing, cartography	0.5–1.0
Data manager	Data acquisition; quality control; database management; metadata documentation	Information technology, data science, statistics	0.5–1.0

¶2 ⓘ **SIDS and sub-1 FTE contexts**

¶3 For small island developing states and other contexts where a sub-1 FTE programme is the norm, the full core team structure above is aspirational. Countries in this context should prioritise a single programme coordinator role and access specialist functions through regional technical assistance platforms such as the Pacific Community (SPC), the CARICOM Regional Statistics Programme, the African Centre for Statistics (UNECA), or the Indian Ocean Commission (IOC), or through GOAP technical assistance missions. Externally led implementation corresponds to Entry point 3 (Opportunity-led pilot) in Section 3.2.1 and is a recognised entry pathway for capacity-constrained countries (Trueb et al., 2024).³

¶4 During Phase 1, a smaller team of two to three staff may be sufficient, provided they have access to specialist advice from other agencies or international partners. The programme coordinator role matters from the outset, as the primary challenge in Phase 1 is institutional coordination rather than technical compilation.

3.4.2 Extended expertise network

¶1 Beyond the core team, ocean accounting requires access to specialised expertise distributed across multiple agencies and institutions:

Specialist role	Contribution
Fisheries scientists	Biomass estimation, stock assessments, and catch data validation.
Oceanographers	Physical and chemical condition data (temperature, salinity, pH, dissolved oxygen).
Biodiversity specialists	Species-level assessments, habitat classification, and ecological integrity indicators.
Economists	Non-market valuation, cost-benefit analysis, and economic impact modelling.
Social scientists	Community surveys, governance assessments, and distributional analysis.
Indigenous knowledge holders	Traditional ecological knowledge, customary use patterns, and cultural value assessment.
IT specialists	Database architecture, web platforms, and data visualisation tools.

¶2 Countries should map existing expertise early in the implementation process and develop formal or informal mechanisms (secondments, advisory panels, memoranda of understanding) to access it on a sustained basis.

3.4.3 Capacity building strategy

¶1 A systematic approach to building and sustaining human capacity should address three time horizons:

¶2 **Short-term:** Targeted training for the core team in SEEA concepts, ocean accounting methods, and relevant tools, combined where possible with practical application to real data through mentored pilot compilation exercises.

¶3 **Medium-term:** Deepening expertise through peer exchanges with more experienced countries and participation in international expert networks. Formal recognition of ocean accounting competencies within institutional human resource frameworks helps retain skilled staff.

¶4 **Long-term:** Embedding ocean accounting in university curricula and national training institutions ensures a pipeline of qualified graduates. Documentation of institutional knowledge (compilation manuals, standard operating procedures, and lesson-learned reports) protects against capacity loss through staff turnover.

3.5 Institutional Arrangements for Implementation

3.5.1 Coordination models

¶1 The coordination arrangement is the first structural decision a country makes when standing up an ocean accounting programme, and it is expensive to reverse. This subsection is normative for the publication. **TG-4.7 National Data Coordination Architectures** Section 3.1 covers the operational design of the resulting committee – mandate content, membership seniority, relationship to existing statistics committees – and **TG-1.10 OA and National Planning Integration** covers how its outputs reach the planning cycle.

¶2 Arrangements observed in environmental-economic accounting programmes vary on two independent axes, and presenting them as a single list of models obscures that the two can be combined:

- ¶3 **Where the mandate sits** – which body holds authority to direct the compilation programme and to request data from contributing agencies.
- ¶4 **What instrument carries it** – the legal or administrative form through which that authority is exercised and sustained.

¶5 Figure 0.8.2 illustrates the contextual considerations that lean toward – but do not determine – each arrangement.

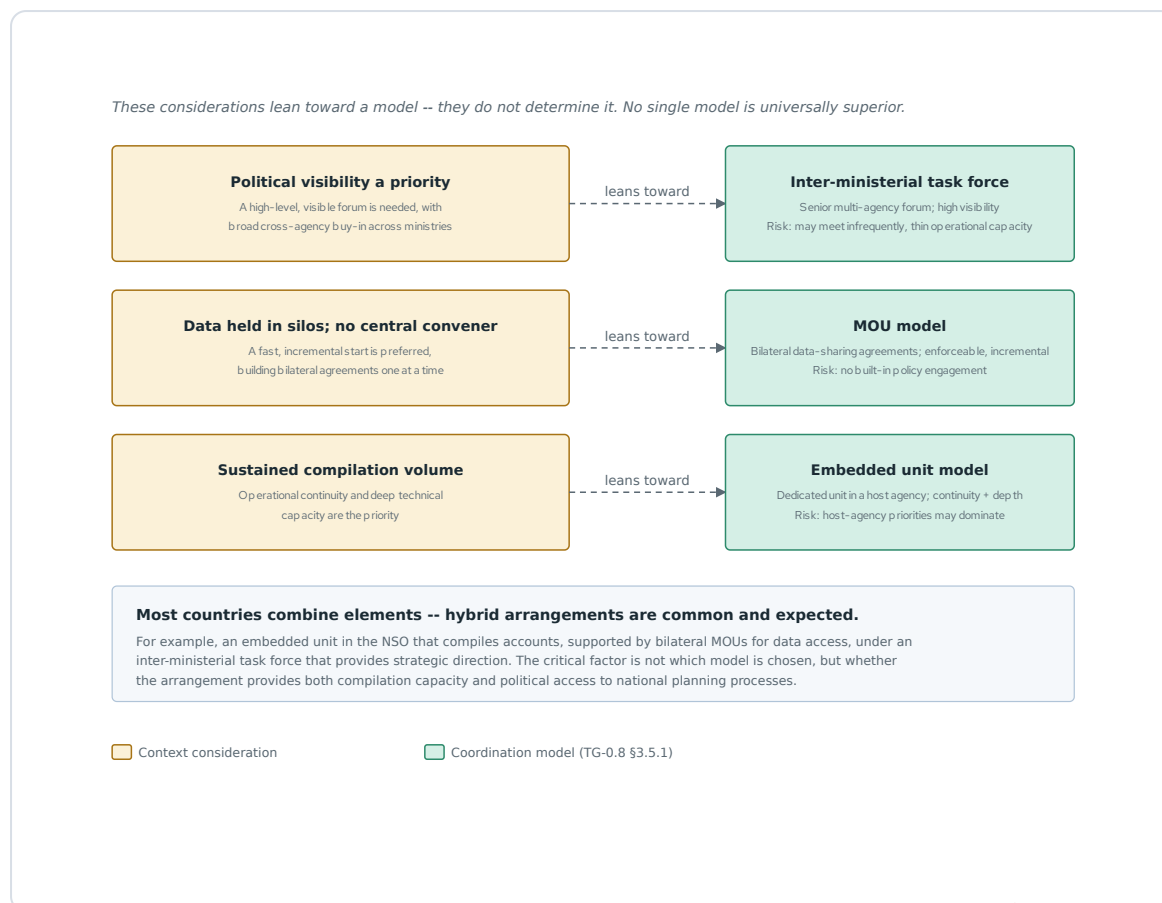


Figure 0.8.2 Three contextual considerations lean toward -- but do not determine -- the task-force, MOU, or embedded-unit coordination model. Dashed "leans toward" links signal non-determinative guidance; hybrid arrangements are common.

Source: TG-0.8 §3.5.1 (coordination models: mandate holders and the instruments that carry the mandate).

Adapted from: UN Fundamental Principles of Official Statistics (Principle 8, coordination of statistical systems); synthesis of WAVES programme country experiences (2012--2021).

¶6 **Table 3.5.1: Coordination arrangements by mandate holder**

Mandate holder	Description	Strengths	Limitations
NSO-led	The national statistical office convenes and chairs, drawing authority from its statistics legislation	Statistical independence; established relationships with data-providing agencies; direct access to national accounts	Lower buy-in from agencies that see themselves as data suppliers rather than partners; may underweight environmental domain expertise
Ocean or environment agency-led	The lead ocean, fisheries or environment agency convenes, drawing authority from its sectoral mandate	Domain expertise; closer to the policy questions the accounts must answer	Weaker statistical authority; risk that outputs are not recognised as official statistics
Joint or multi-agency	Co-chaired or rotating leadership between the NSO and a lead ocean agency	Distributes authority; strongest cross-agency buy-in	Requires explicit terms of reference to resolve methodological disputes; slower decisions
Dedicated unit	A permanent unit with recurrent budget, hosted within an existing agency	Strongest operational continuity, technical depth and institutional memory	Programme priorities shaped by the host agency; other agencies may treat it as not theirs

Mandate holder	Description	Strengths	Limitations
Nested	An overarching body with domain sub-committees (fisheries data, ecosystem condition, marine economic data)	Scales to large statistical systems with many custodians	Coordination overhead; slowest to decide

¶7 *Table 3.5.2: Instruments that carry the mandate*

Instrument	Description	Strengths	Limitations
Cabinet decision, ministerial order or decree	Establishes an inter-ministerial task force, steering committee or commission	High political visibility; authority to request data across government	Can become a forum that meets rarely and lacks capacity between meetings; senior members may delegate to staff without authority to commit
Bilateral or multilateral MOUs	Agency-to-agency agreements specifying data, format, frequency, quality and contact points	Fast to establish; enforceable commitments that survive personnel change; can be built incrementally	Governs data flow but not policy engagement; needs a separate route to the planning forums
Budget line and establishment	A staffed unit with recurrent funding and an explicit compilation mandate	Continuity independent of individual advocacy	Slow to establish; requires budget allocation and recruitment
Framework legislation	Statutory basis for ocean accounting and its data access	Most durable	Rarely available within the timeframe of a first compilation

¶8 Most working arrangements combine both axes. A common and effective configuration is a dedicated unit in the NSO for compilation, bilateral MOUs for data access, and a cabinet-mandated inter-ministerial committee for strategic direction and policy engagement. Countries also migrate between configurations: beginning with MOUs and adding a unit once compilation volume justifies permanent staffing, or adding a committee layer when political visibility becomes the constraint. Such transitions should be anticipated in the founding terms of reference.

¶9 The determinant of success is not which configuration is chosen but whether the arrangement supplies **both** technical capacity to compile and political access to the forums where decisions are made. An arrangement with one and not the other fails predictably: a well-staffed unit whose outputs never reach cabinet, or a high-level committee with nothing to present.

¶10 **Indicative fit.** NSO-led suits systems with few data custodians and strong NSO environmental capacity. Joint arrangements suit a moderate number of custodians and existing inter-agency mechanisms. Nested arrangements suit large systems with many custodians. These are starting points; where a country falls near a boundary, the qualitative factors above should outweigh the count of agencies.

¶11 **Federal and shared-jurisdiction contexts.** In federal systems – Australia, India, Canada – the arrangement must operate at both sub-national and national level, with an additional inter-governmental layer to harmonise methods and consolidate data flows between jurisdictions. In Pacific island states with shared or delegated ocean data access, such as the Federated States of Micronesia, the Marshall Islands and Palau, relevant data may be reached through regional bodies or bilateral arrangements rather than domestic agency networks; countries in this position should consult the GOAP Secretariat for tailored guidance.

¶12 **Country examples.** Australia's Australian Bureau of Statistics leads environmental-economic account compilation under its national statistics mandate, coordinating inputs from the

Department of Climate Change, Energy, the Environment and Water – an NSO-led arrangement. Canada pairs Statistics Canada with Environment and Climate Change Canada under a co-led technical arrangement – a joint arrangement. Indonesia’s inter-ministerial working group on other effective area-based conservation measures convenes the fisheries, environment and planning agencies through a ministerial instrument, with sector sub-groups feeding a central body – a nested arrangement carried by a cabinet-level mandate. Further country evidence is in the Section 5 case studies, including **TG-5.1 Australia**, **TG-5.4 India** and **TG-5.5 Indonesia**. Where a case study and this section describe the same country differently, the case study is the record of what that country did.

3.5.1.1 Reviewing and adapting the arrangement

¶1 Establishing an arrangement is not a one-time decision. Three diagnostics indicate whether it is still working:

- ¶2 **Meeting regularity and seniority.** A declining meeting rate, or persistent delegation to staff without authority to commit, signals attrition.
- ¶3 **Data-delivery compliance against agreed schedules**, as recorded in MOU delivery logs or data-sharing registers. Missed or delayed deliveries indicate a commitment that needs renewal or renegotiation.
- ¶4 **Proportion of planning-cycle entry points met on time.** Systematic lateness points to a compilation-cycle misalignment rather than a coordination failure, and is addressed through the scheduling in TG-1.10 Section 3.2.

¶5 Review at the close of each national planning cycle – typically every three to five years – or when a major funding or personnel disruption occurs, such as a budget cut to the compilation agency or the departure of a key champion. A significant change in the scope of the accounting programme, such as adding new account types, should also trigger a review of whether the existing arrangement can carry it.

3.5.1.2 Champions and their sustainability

Why champions matter

¶1 Institutional arrangements alone do not sustain ocean accounting programmes. Formal mandates, coordination bodies, and data-sharing agreements provide the structural scaffolding, but programmes depend on individuals who advocate for the accounting programme, defend its budget allocation during fiscal contractions, explain its value to sceptical colleagues, and connect technical outputs to policy debates. These individuals are champions, and their role is particularly important for ocean accounting because the field is relatively new, the outputs are unfamiliar to many planning officials, and the benefits of accounting may take several compilation cycles to become apparent.

¶2 Countries that have successfully sustained environmental-economic accounting programmes over multiple years consistently identify the presence of senior advocates – in the NSO, in the finance ministry, or in the head of government’s office – as a critical success factor. The WAVES programme emphasised that “high-level political commitment” and “champions at senior levels of government” are among the most important prerequisites for successful natural capital accounting implementation. Champions serve three distinct functions that correspond to three types of champion: political, technical, and institutional. Effective ocean accounting programmes cultivate all three types, recognising that each serves a different purpose and operates in a different institutional space.

Political champions

¶3 Political champions are elected officials or senior political appointees who use their public platform and decision-making authority to advocate for ocean accounting. A minister of finance who cites ocean accounting data in budget speeches, a president or prime minister who references natural capital depletion in state-of-the-nation addresses, or a parliamentarian who calls for ocean

economy reporting in legislative oversight hearings – these are political champions. Their advocacy creates the political demand signal that justifies budget allocations for compilation work and motivates agency heads to prioritise data contributions.

¶4 Identifying potential political champions requires understanding which political leaders have both an interest in ocean issues and the institutional position to influence planning processes. In many countries, the minister of finance or the head of the planning ministry is the most influential political champion because they control resource allocation decisions. In small island developing States, where the ocean economy may constitute a large share of national GDP, the head of government may take a personal interest in ocean accounting as a tool for demonstrating the country's marine resource endowment in international forums.

¶5 Engaging political champions requires translating accounting outputs into the language of political priorities. Politicians are interested in answers to questions such as: How much does the ocean contribute to our economy? Are our fish stocks growing or declining? Will our grandchildren inherit the same marine resources we have today? What return does the public get from investing in fisheries management or marine protected areas? Ocean accounting provides rigorous, internationally standardised answers to these questions. The budget presentation table format described in **TG-1.1** Section 3.3 provides one such format. The depletion-adjusted GVA narrative in **TG-1.1** Section 3.4 and the MTEF integration approach in **TG-1.1** Section 3.6 provide the political-economy arguments most likely to resonate with finance and planning champions.

¶6 This category of champion is inherently transient. Elections, cabinet reshuffles, and changes of government disrupt political advocacy. The governance design should therefore aim to build support across political parties and across multiple levels of government, so that ocean accounting survives changes in political leadership.

Technical champions

¶7 In statistical, scientific, and analytical agencies, technical champions are the senior professionals who drive the methodological development and compilation quality of ocean accounts. The chief national accountant at the NSO, the chief scientist at the fisheries research institute, or the head of the marine environment division at the environment ministry – these individuals provide the technical credibility that underpins the programme's outputs and advocate for methodological investment within their agencies.

¶8 Technical champions are essential because ocean accounting requires sustained investment in statistical infrastructure, data systems, and human capital. When the NSO faces competing demands for limited compilation resources, a chief national accountant who understands the value of environmental-economic accounting will protect the ocean accounts compilation programme from being crowded out by other priorities. When the fisheries research institute is asked to provide stock assessment data in formats compatible with asset account requirements, a chief scientist who appreciates the planning applications of the data will ensure that staff time is allocated to the task.

¶9 Engagement strategies for technical champions should emphasise professional recognition and methodological advancement. Countries should support technical champions by funding participation in international meetings of the UN Committee of Experts on Environmental-Economic Accounting (UNCEEAA), the Global Ocean Accounts Partnership, and relevant regional statistical bodies. These forums provide both professional development and peer recognition that strengthen the champion's commitment and institutional standing.

¶10 Structured peer networks also benefit technical champions. The 2025 SNA Implementation Strategy identifies a "Compilers Hub" as a "digital global collaboration platform" for sharing knowledge and facilitating collaboration. Ocean accounting programmes should connect their technical champions to such platforms, enabling them to learn from the experiences of peers in other countries.

Institutional champions

¶11 Agencies become institutional champions when they adopt ocean accounting as a core part of their mandate and allocate recurrent budget and staff to compilation and policy communication. An NSO that lists ocean accounts in its multi-year statistical work programme, a planning ministry that requires ocean economy data in its development plan templates, or a fisheries ministry that uses asset account data as a standard input to stock management decisions – these agencies are institutional champions. Their commitment outlasts individual personnel changes because the accounting function is embedded in organisational structures, job descriptions, and budget lines.

¶12 Building institutional champions requires demonstrating that ocean accounting serves the agency's existing mandate rather than imposing additional work with unclear returns. For the NSO, ocean accounts extend the thematic and extended accounts portfolio that the 2025 SNA identifies as a priority, and this contributes to the agency's core mission of measuring economic performance and well-being. For the fisheries ministry, asset accounts provide the biomass trajectory data needed for stock management decisions that the ministry is already mandated to make. For the planning ministry, ocean economy data fill an information gap in development diagnostics that the ministry recognises but currently lacks the data to address.

¶13 The most effective approach to building institutional champions is to co-design the accounting programme with potential champion agencies. This co-design should ensure that the compilation outputs address questions the agency already faces. The coordination model chosen (Section 3.5.1) should be designed to facilitate this co-design process, bringing potential institutional champions into the programme design phase rather than presenting them with a completed plan.

Champion sustainability strategies

¶14 Sustaining champions over time requires deliberate investment in four areas:

¶15 **Succession planning.** When a champion retires, transfers, or is promoted, the programme loses advocacy capacity. Coordination bodies should identify and cultivate successor champions before transitions occur, ensuring that at least two individuals in each key agency understand and can advocate for the programme.

¶16 **Regular demonstration of value.** Champions can only sustain their advocacy if the programme produces outputs that demonstrably inform policy decisions. The coordination body should maintain a register of policy applications – instances where ocean accounting data influenced a budget allocation, a planning target, or a policy evaluation – and communicate these applications to champions and their superiors. The register should be owned by the coordination-body secretariat and maintained as a standing log recording, for each entry: the date, the decision context, the specific account data used, and the decision outcome. The budget use cases described in **TG-1.1** Section 3.5 provide templates for documenting such applications. The log should be updated quarterly or at the close of each planning cycle, and an annual synthesis should be presented to champion agencies. Entries involving budget decisions or cabinet processes should be reviewed by the coordination-body secretariat before inclusion in the annual public synthesis, and sensitive entries may be retained in an internal-only log until the relevant decision is publicly available.

¶17 **International recognition.** Champions' domestic standing is strengthened when their country's ocean accounting programme receives international recognition. Presenting results at UN Statistical Commission sessions, contributing to GOAP technical publications, or hosting study visits from other countries all enhance the programme's reputation and the champion's standing within their agency.

¶18 **Embedding in institutional processes.** The most durable form of champion support is to embed ocean accounting in the routine institutional processes of champion agencies – statistical work programmes, budget templates, planning guidelines, and performance indicators. Once ocean accounting data are required inputs to processes that agencies must complete regardless of individual preferences, the programme acquires institutional momentum that does not depend on any single champion's continued advocacy.

3.5.2 Implementation readiness checklist for institutional arrangements

¶1 Countries should aim to address all items by the end of Phase 1, though items 7 and 8 may extend into Phase 2:

1. ¶2 **Lead agency designated:** A single agency has been identified as the lead for ocean accounting, with endorsement from relevant senior officials.
 2. ¶3 **Coordination mechanism established:** An inter-agency coordination mechanism has been formed with representation from the NSO, environment/ocean agency, and at least two major data providers.
 3. ¶4 **Terms of reference agreed:** The coordination mechanism has documented terms of reference specifying its mandate, membership, meeting frequency, and decision-making procedures.
 4. ¶5 **Work programme adopted:** A time-bound work programme has been adopted, specifying which accounts will be compiled, by whom, and on what timeline.
 5. ¶6 **Data-sharing agreements executed:** Formal or semi-formal data-sharing agreements are in place with at least the core data providers identified in the data inventory.
 6. ¶7 **Core team assembled:** A core team of at least two to three staff has been identified or recruited, with dedicated time allocated to ocean accounting.
 7. ¶8 **Budget secured:** Multi-year funding (covering Phase 1 in full, with a credible plan for transition to recurrent budget support) has been secured.
 8. ¶9 **Quality assurance framework adopted:** Quality assurance procedures consistent with [TG-0.7](#) have been documented and endorsed by the lead agency.
 9. ¶10 **Stakeholder engagement plan developed:** Key policy users have been identified, their information needs assessed, and a plan for regular engagement adopted.
 10. ¶11 **International linkages established:** The country has connected with the GOAP network, relevant UN regional commissions, and other international or regional support mechanisms.
- ¶12 For how account outputs reach the planning cycle once an arrangement is in place, see [TG-1.10 OA and National Planning Integration](#). For data coordination architectures, see [TG-4.7 National Data Coordination Architectures](#).

3.6 Country Commitment Framework

¶1 This section provides a commitment checklist for use at the readiness assessment stage, before implementation begins. It records political endorsement, resource commitment, and accountability mechanisms as preconditions for programme launch. For guidance on embedding ocean accounts in national planning frameworks and integrating accounts into budget cycles, see [TG-1.10 OA and National Planning Integration](#).

¶2 A country commitment framework for ocean accounting should address the following elements:

- ¶3 **Political endorsement:** A statement of commitment from an appropriate authority (minister, chief statistician, or inter-ministerial body) establishing ocean accounting as a national priority. The statement should reference the policy objectives ocean accounting will support and the institutional arrangements to be put in place.
- ¶4 **Strategic plan integration:** Inclusion of ocean accounting in the NSDS or equivalent national statistical plan. For countries without an NSDS, ocean accounting can be included in the strategic plan of the lead agency.
- ¶5 **Resource commitment:** An explicit commitment to allocate financial, human, and infrastructure resources. The commitment should distinguish between initial investment (which may draw on international technical assistance) and recurrent production costs (which should transition to domestic funding). A realistic budget estimate, benchmarked against GOAP partner country experience, should accompany the resource commitment.

¶6 **Timeline and milestones:** A time-bound implementation plan with clear milestones aligned to the phased pathway in Section 3.2 (e.g., “Complete data inventory by month 6 of Phase 1; publish first ecosystem extent account by end of Phase 1”).

¶7 **Accountability mechanism:** A designated person or body responsible for monitoring implementation progress and reporting to the coordination mechanism and senior leadership at least annually.

¶8 Countries should plan early wins: policy-relevant outputs deliverable in the early stages of the programme. Phase 1 account types (see Section 3.2.1) serve well as early wins because they are feasible with existing data and are directly relevant to common policy processes.

3.7 Scoping and Pilot Implementation: Experience from the ESCAP Programme

3.7.1 The Diagnostic Tool as a scoping instrument

¶1 The ESCAP Ocean Accounts Pilot Programme (2019) demonstrated a structured implementation methodology across five countries: China, Malaysia, Samoa, Thailand, and Vietnam, each of which established a national inter-agency working group. ESCAP also supported pilot studies in Indonesia and Vanuatu. The approach used the Diagnostic Tool for Environment Statistics as a framework for guiding a structured conversation among stakeholders to determine which accounts should be prioritised⁶.

¶2 The Diagnostic Tool addresses two core components:

¶3 *Table 3.7.1: Diagnostic Tool components for ocean accounts scoping*

Diagnostic component	Practical actions
Statement of strategy and policy priorities	Document national visions and priorities related to the environment, biodiversity, sustainable development, and the ocean economy. Link priorities to environmental concerns such as pollution, overfishing, or habitat loss.
Institutional mapping	Identify producers and users of related information (government agencies, academia, NGOs, international agencies), as well as civil society stakeholders who can benefit from improved information. Identify relevant institutional mechanisms currently in place.

¶4 Pilots to date have addressed topics including the value of the ocean economy and sustainability of food supply, physical measures of regulating and maintenance services (coastal protection, carbon sequestration, water purification), ecosystem extent and change (e.g., decline in mangrove area, increase in marine protected area coverage), land-based sources of marine pollution, and resource requirements of coastal tourism. The following table illustrates the types of pilot topics selected across the ESCAP programme:

¶5 *Table 3.7.2: ESCAP pilot topics and associated policy concerns*

Topic	Policy concern
Value of the ocean economy	Sustainability of ocean economy, equitable distribution of benefits, sustainability of food supply
Non-market ocean services	Physical measures of regulating and maintenance services (coastal protection, flood mitigation, carbon sequestration, water purification)
Ecosystem extent and/or designated use	Area of ecosystem types and uses of concern; change in area
Land-based sources of marine pollution	Reducing habitat degradation and biodiversity loss
Resource requirements of coastal tourism	Sustainability of tourism economy

¶6 The scoping phase typically involved an independent consultant, the National Statistical Office, or a responsible government agency coordinating a detailed scoping report. Most pilots identified data availability and access as major constraints and addressed these by using publicly available data, establishing data sharing arrangements with relevant institutions, or conducting original field-work and socio-economic surveys. A second national workshop reviewed preliminary results, benefited from additional technical guidance, and developed messaging for a release document. The process was followed in all five ESCAP pilots, which demonstrated substantial results within an approximately six-month timeframe⁷.

Case illustration: Vietnam ESCAP Pilot (Quang Ninh Province, 2019)

The 2019 ESCAP ocean accounts pilot for Vietnam integrated UNEP-WCMC global data on coral reefs and seagrasses with local data on mangroves, ports, and marine protected areas to assess ecosystem extent changes in Quang Ninh Province. The pilot overlaid multiple spatial datasets from different institutions within a common spatial framework to produce an initial physical ecosystem extent account. The combined datasets revealed relationships between port development, shipping routes, protected area coverage, and changes in mangrove, coral, and seagrass extent⁸.

¶7 The Vietnam pilot illustrates a broader finding from the ESCAP programme: initial ocean accounts can be compiled by integrating existing data from multiple sources within a common spatial and classificatory framework, rather than requiring substantial new data collection. The scoping reports produced by each pilot country have been published by ESCAP and provide detailed documentation of the diagnostic process, data sources used, and accounts compiled⁹.

3.7.2 Prioritising account types

¶1 When capacity allows only one or two pilot topics, countries can use the following decision matrix to align account type selection with the policy context driving demand. The matrix is a starting point rather than a decision rule; the Diagnostic Tool above and TG-1.4 Table 3.2.2 provide complementary views.

¶2 *Table 3.7.3: Policy context and recommended first-priority account types*

Policy context	Recommended first-priority account type	Rationale
Fisheries crisis or stock collapse	Asset accounts – fish stocks (TG-3.1)	Directly informs stock recovery targets and sustainable yield; links to SDG 14.4
SDG Voluntary National Review (VNR)	Extent accounts + condition accounts	Low data threshold; maps to SDG 14.5.1 (MPA coverage) and 14.2 targets
Blue economy strategy	Economic activity accounts (TG-2.5)	Quantifies current ocean economy contribution; baseline for growth target-setting
Pollution emergency	Residual flow accounts (TG-3.4)	Traces land-based pollution sources; supports intervention targeting

¶3 Countries with limited capacity should consider extent accounts as the lowest-cost, highest-data-availability starting point: area data for major ecosystem types can typically be compiled from existing remote sensing products and protected area registries without primary data collection. The planning-use-case view of the same question is **TG-1.4 OA and Sustainable Ocean Planning Table 3.2.2**.

¶4 This scoping phase precedes Phase 1 of the pathway in Section 3.2 and produces the account priorities the Phase 1 work programme implements.

3.8 Investment Readiness for Ocean Finance

¶1 Readiness for ocean finance is a specific case of the country readiness this Circular addresses. A proposal fails to attract finance for much the same reasons a national accounting programme stalls: an inadequate evidence base, no counterfactual, targets that cannot be measured against a compiled account, and no commitment to compile it again. The instruments themselves are treated in **TG-1.8 OA and Project-Level Finance** and the multilateral project cycle in **TG-1.7 OA and Multilateral Development Finance**.

3.8.1 Nature-based solutions: minimum evidence

¶1 Nature-based solutions (NBS) for ocean and coastal environments represent a growing category of investable projects, but many promising NBS proposals fail to attract finance because they lack the structured evidence base that investors require. The minimum information requirements are set out below.

¶2 **NBS typology for ocean contexts.** Ocean-related NBS can be categorised into three broad types, each with distinct accounting requirements:

NBS Type	Examples	Key Account Types	Primary Service Flows
Restoration	Mangrove replanting, coral reef rehabilitation, seagrass bed recovery	Extent accounts (area change), condition accounts (recovery trajectory)	Coastal protection, carbon sequestration, fisheries habitat
Protection	Marine protected areas, no-take zones, coastal setback areas	Extent accounts (area maintained), condition accounts (baseline preservation)	Biodiversity maintenance, tourism amenity, coastal protection
Sustainable management	Sustainable fisheries, integrated coastal zone management, sustainable aquaculture	Physical supply and use tables (extraction rates), asset accounts (stock levels)	Provisioning services, waste assimilation, cultural services

¶3 **Minimum evidence requirements.** For any NBS proposal to be considered investment-ready, the information summarised in Table 3.8.1 below should be available from Ocean Accounts or compilable from existing account data.

¶4 *Table 3.8.1: Minimum evidence requirements for NBS investment readiness*

Requirement	Description
Baseline ecosystem extent	Current area of the target ecosystem type, compiled from ecosystem extent accounts using the IUCN Global Ecosystem Typology classifications described in TG-3.1 Asset Accounts .
Baseline ecosystem condition	Current condition of the target ecosystem relative to reference condition, using the condition indicators and reference frameworks described in TG-2.1 Aggregate Biophysical Indicators of Environmental State .
Service flow quantification	Estimated annual flow of ecosystem services from the target ecosystem, in both physical and monetary terms.
Counterfactual scenario	Projected ecosystem trajectory in the absence of NBS intervention, based on historical trends in extent and condition accounts.
Outcome targets	Quantified targets for extent, condition, and service flow improvements over the investment horizon.
Monitoring plan	Schedule and methodology for ongoing account compilation to track outcomes against targets.

¶5 **Connecting NBS to finance instruments.** Different NBS types align with different financial instruments. Restoration projects typically suit results-based payment mechanisms (including blue carbon credits and performance-based grants) because outcomes can be measured through extent and condition account changes. Protection projects align with sovereign commitments (including debt-for-nature swaps) where the maintenance of ecosystem condition is the deliverable. Sustainable management projects can support blue bonds and sustainability-linked loans where KPIs are derived from supply and use table metrics such as extraction rates relative to maximum sustainable yield. For detailed guidance on these instrument types, see **TG-1.8 OA and Project-Level Finance**.

3.8.2 Investment-readiness scoring

¶1 **Scoring rubric.** The investment-readiness score is based on six dimensions, each scored from 0 (not addressed) to 4 (fully developed):

Dimension	Score 0	Score 1	Score 2	Score 3	Score 4
Baseline data	No baseline	Ad hoc data, no accounting framework	Partial accounts compiled (extent only)	Extent and condition accounts compiled	Full suite: extent, condition, service flow, and monetary accounts
Counterfactual	No counterfactual	Qualitative narrative only	Trend extrapolation from limited data	Time-series accounts with trend analysis	BACI design with control sites and multi-period accounts
Impact targets	No targets	Aspirational targets, no metrics	Targets with metrics but no account linkage	Targets linked to specific account indicators	Targets with account-derived metrics, thresholds, and adaptive triggers
Monitoring plan	No plan	Plan without data sources	Plan with data sources but no schedule	Scheduled plan aligned with financial reporting	Fully specified plan with BACI design, quality assurance, and feedback loops
Financial structure	No structure	Concept-stage instrument design	Instrument identified with preliminary terms	Terms negotiated, accounts integrated into covenants	Instrument structured, accounts embedded in legal documentation
Disclosure alignment	No disclosure plan	Awareness of frameworks	Partial alignment with one framework	Aligned with TNFD or IFRS	Aligned with multiple frameworks (TNFD, IFRS, CBD Target 15)

¶2 **Threshold scores.** Based on the scoring rubric, projects can be classified into readiness categories:

- ¶3 **Score 0-8:** Not investment-ready. Substantial gaps in evidence base and financial structuring. Requires further account compilation and capacity building before approaching investors.
- ¶4 **Score 9-14:** Emerging readiness. Core elements are in place but important gaps remain. Targeted technical assistance can address specific weaknesses.
- ¶5 **Score 15-19:** Investment-ready with conditions. Evidence base is substantially complete. Financial structuring may require refinement. Suitable for engagement with concessional finance providers and blended finance structures.
- ¶6 **Score 20-24:** Fully investment-ready. Complete evidence base from Ocean Accounts, sound financial structuring, and full disclosure alignment. Suitable for engagement with commercial investors and capital markets.

¶7 **Application of the scoring methodology.** Project developers can use this methodology as a self-assessment tool to identify gaps in their evidence base. MDBs and development finance institutions can use it as a screening tool to prioritise technical assistance. Financial institutions can use it as part of their due diligence process to evaluate the quality of environmental evidence underpinning project proposals. Sections 3.1 and 3.3 of this Circular set the wider readiness and quality assurance context this rubric sits within.

3.8.3 Shared investment criteria

¶1 To facilitate comparability and reduce transaction costs across the GOAP network, this section sets out shared investment criteria that participating countries can adopt when preparing ocean finance proposals. These criteria are grounded in Ocean Account data and designed to be applicable across different financial instrument types and country contexts.

¶2 Common criteria.

Criterion	Description	Account Evidence Required
Ecosystem baseline	The proposal documents the current state of the target marine or coastal ecosystem	Ecosystem extent accounts and condition accounts for the project area
Service flow quantification	The proposal quantifies the ecosystem services that the project will maintain, restore, or enhance	Physical supply and use tables for relevant ecosystem services
Monetary valuation	The proposal includes monetary estimates of ecosystem service values and/or asset values	Monetary supply and use tables or monetary asset accounts
Additionality	The proposal demonstrates that the project will deliver environmental outcomes beyond what would occur without the intervention	Time-series accounts establishing the counterfactual trajectory
Monitoring commitment	The proposal includes a plan for ongoing account compilation to track project outcomes	Account compilation schedule with specified account types and data sources
Disclosure alignment	The proposal specifies which international disclosure frameworks the project will report against	Mapping of account-derived indicators to TNFD, IFRS, and/or CBD requirements

¶3 **Quality assurance.** Shared investment criteria are only effective if the underlying data meet quality standards. The GOAP framework recommends that all account data used in finance proposals be compiled in accordance with the quality assurance principles described in the relevant TG circulars: adherence to official statistics principles (relevance, accuracy, timeliness, accessibility, coherence), use of internationally agreed classifications, and transparent documentation of data sources and methods.

¶4 **Applying common criteria across instrument types.** The shared criteria are designed to be applicable regardless of the specific financial instrument being used. For blue bonds, the criteria ensure that use-of-proceeds frameworks are grounded in account data. For debt-for-nature swaps, the criteria provide the monitoring framework for conservation commitments. For results-based payment mechanisms, the criteria establish the measurement basis for performance verification. For blended finance structures, the criteria provide the common evidence base that aligns public and private investors around shared environmental objectives.

¶5 **Iterative improvement.** The shared investment criteria should be treated as a living framework that evolves as implementation experience accumulates across GOAP partner countries. Countries are encouraged to share lessons through the peer exchange mechanisms in Section 3.9 below.

3.8.4 Institutional and data requirements

¶1 *Table 3.8.2: Roles in account-finance integration*

Actor	Role
National Statistical Offices	Responsible for compiling accounts according to official statistics principles.
Environmental Agencies	Providing biophysical data on ecosystem extent, condition, and services.
Finance Ministries	Integrating account data into sovereign debt management and public finance.
Project Developers	Using account frameworks for project design and impact assessment.
Financial Institutions	Incorporating account data into due diligence and monitoring.

¶2 Data Requirements

¶3 Effective use of Ocean Accounts for finance requires:

1. ¶4 **Baseline Data:** Pre-project extent, condition, and service flow data against which changes can be measured
2. ¶5 **Monitoring Frequency:** Account compilation schedules aligned with financial reporting cycles
3. ¶6 **Spatial Resolution:** Data at scales relevant to project boundaries and impacts
4. ¶7 **Uncertainty Documentation:** Clear communication of data quality and limitations

¶8 Capacity Building

¶9 Many countries require capacity building to compile and use Ocean Accounts for finance, including:

- ¶10 Training for account compilers on finance-relevant account applications
- ¶11 Guidance for financial institutions on interpreting and using account data
- ¶12 Development of standardised indicators linking accounts to financial instrument requirements
- ¶13 Establishment of institutional arrangements for ongoing account compilation and dissemination

¶14 SDG 14 Indicator Linkages

¶15 In the Ocean Accounts Framework (TG-0.1), socio-economic outcomes of ocean finance projects correspond to Edge E5 (economic contributions to social conditions), whilst ecosystem service returns correspond to Edge E9 (ecosystem services to economy). SDG indicator 14.7.1 (sustainable fisheries as a proportion of GDP) can be derived from the economic activity accounts by identifying the value added of sustainably managed fisheries relative to total GDP. SDG indicator 14.a.1 (the proportion of total research budget allocated to marine research) can be compiled from government expenditure accounts classified by function. These indicators, when compiled through Ocean Accounts, provide standardised metrics that project-level finance instruments can reference in their impact reporting frameworks. For example, a blue bond whose proceeds support sustainable fisheries management can report on its contribution to SDG 14.7.1 using data compiled within the same accounting framework that underpins the bond's KPI monitoring.

3.9 Peer Exchange, Regional Platforms and South-South Cooperation

3.9.1 Regional platforms as enablers

¶1 Regional platforms and organisations enable national ocean accounting programmes by providing technical support, facilitating peer learning, and creating political demand for comparable cross-country ocean data. The Global Ocean Accounts Partnership (GOAP) and regional statistical bodies such as the Economic and Social Commission for Asia and the Pacific (ESCAP) have developed regional ocean accounting platforms that support country-level implementation. Whilst SEEA EA paras. 13.90-13.92 describe regional implementation arrangements in general terms, specific guidance for the ESCAP region is provided in the *ESCAP Ocean Accounts Framework* (UN ESCAP, 2021). Countries outside the ESCAP region – including those in the Atlantic, Caribbean, West Africa,

and Latin America sub-regions – should engage directly with the GOAP Secretariat for region-specific technical support. GOAP maintains a register of regional support contacts and can connect countries with relevant peer networks and technical assistance where no dedicated regional platform yet exists.

¶2 These platforms support national programmes in three ways. First, countries should use regional technical assistance to build initial compilation capacity. Regional bodies often have access to technical expertise and compilation tools that individual countries – particularly small island developing States with limited statistical capacity – cannot develop independently. Second, participate in regional peer-learning networks that enable countries at different stages of implementation to share experiences, methodological innovations, and lessons from coordination challenges. Third, use regional forums to build political support for ocean accounting by presenting national results in contexts where comparison with neighbouring countries creates incentives for continued investment.

3.9.2 Regional fisheries and ocean governance bodies

¶1 Regional fisheries management organisations (RFMOs), large marine ecosystem programmes, and regional seas conventions provide governance platforms where ocean accounting data have direct policy applications. RFMOs require stock assessment data that physical fish stock asset accounts (**TG-3.1 Asset Accounts**) can provide. Large marine ecosystem programmes (such as those supported by the Global Environment Facility) require integrated environmental-economic assessments that ocean accounts are designed to produce. Regional seas conventions (such as the Nairobi Convention, the Barcelona Convention, and the Noumea Convention) increasingly call for integrated marine and coastal area assessments that draw on the kinds of data ocean accounts compile.

¶2 The coordination body should identify the regional ocean governance bodies relevant to the country and establish channels through which ocean accounting outputs reach these forums. This serves the dual purpose of demonstrating international applications that strengthen the domestic case for continued compilation and contributing to the evidence base for regional ocean management decisions.

3.9.3 South-South cooperation

¶1 Countries that have established ocean accounting programmes can support neighbouring countries through South-South cooperation arrangements. These arrangements – which may include secondment of technical staff, joint training programmes, and shared compilation tools – accelerate implementation in receiving countries whilst deepening the expertise of contributing countries. The coordination body should explore South-South cooperation opportunities with countries in the same region or with similar ocean economies, building networks that sustain implementation beyond the initial establishment phase.

3.9.4 Peer exchange for account-finance integration

¶1 Many countries implementing Ocean Accounts face similar challenges in mobilising finance for ocean sustainability. South-South exchange mechanisms enable countries to share experiences, transfer practical knowledge, and develop common approaches to account-based finance mobilisation.

¶2 **Peer learning for account-finance integration.** Countries that have successfully used Ocean Accounts to support finance mobilisation can share their experience with countries at earlier stages of implementation. Effective peer learning involves structured exchanges focused on specific aspects of the account-finance pipeline: how accounts were compiled, how they were presented to financial institutions, what investor feedback was received, and how account products were refined in response. The GOAP network provides a platform for such exchanges, and participating countries

are encouraged to document their experiences in standardised formats that facilitate cross-country learning.

¶3 **Standardised templates for finance proposals.** One practical output of South-South exchange is the development of standardised templates for finance proposals that incorporate Ocean Account data. These templates reduce the transaction costs of preparing finance documentation and ensure that account data are presented in formats that investors and MDBs recognise. Key template elements include:

Template Component	Content	Account Source
Natural capital baseline	Summary of ecosystem extent, condition, and monetary value	Extent, condition, and monetary asset accounts
Risk narrative	Nature-related risks to economic sectors	Supply and use tables, condition trend data
Impact targets	Quantified targets for ecosystem outcomes	Derived from condition and extent account projections
Monitoring framework	Schedule and methods for ongoing account compilation	Account compilation plan
Results indicators	Standardised metrics for reporting	Account-derived indicators mapped to disclosure frameworks: TG-1.11 Section 3.3

¶4 **Regional cooperation on account compilation.** For transboundary marine ecosystems (shared fisheries, migratory species corridors, large marine ecosystems), coordinated account compilation across countries strengthens the collective evidence base for regional finance proposals. Regional development banks and multilateral funds favour programmatic approaches that address transboundary challenges, and harmonised Ocean Accounts across participating countries provide the coordinated data infrastructure that such programmes require.

¶5 **Knowledge exchange formats.** Effective South-South exchange can take several forms:

- ¶6 **Technical workshops:** Hands-on training in account compilation and finance application, typically hosted by a country with implementation experience
- ¶7 **Study tours:** Visits to countries that have successfully used accounts to mobilise finance, allowing direct observation of institutional arrangements and data systems
- ¶8 **Twinning arrangements:** Long-term partnerships between countries at different stages of implementation, with regular exchange of staff and knowledge
- ¶9 **Online communities of practice:** Ongoing platforms for sharing templates, methodologies, and lessons learned across the GOAP network

4. Limitations and Considerations

4.1 Context sensitivity

¶1 The readiness assessment framework and phased pathway provide a general model that must be adapted to country-specific circumstances. Small island developing states may face distinctive challenges related to limited institutional capacity and data infrastructure but may also benefit from relatively simpler ocean geographies and strong policy demand. Large maritime nations may have abundant data and institutional resources but face coordination challenges across multiple agencies and levels of government.

4.2 Assessment subjectivity

¶1 Self-assessment inherently involves subjective judgement. Countries can mitigate that subjectivity by including diverse perspectives in the assessment team, requiring evidence to support

scores, and inviting external review through GOAP peer review or technical assistance missions (see Section 3.1.3 Step 6).

4.3 Dynamic nature of readiness

¶1 Readiness is not a fixed state. Changes in government priorities, staffing, funding, or data availability can shift readiness levels in either direction. The assessment should be treated as a living instrument updated regularly and used to inform adaptive management of the implementation programme.

5. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

¶3 This Circular draws on the methodological frameworks established by the System of Environmental-Economic Accounting – Ecosystem Accounting (SEEA EA), the Strategy for Implementing 2025 SNA and BPM7, the UN National Quality Assurance Frameworks Manual, the Global Statistical Geospatial Framework (2nd edition), and NSDS guidelines.¹⁰ The guidance also benefits from the practical experience of GOAP partner countries in implementing ocean accounts across diverse institutional contexts.

6. References and Notes

1. ¶1 Levels reflect the progressive implementation model described in Chapter 1 of the SEEA EA Implementation Guide (UN, 2021). Consistency with SEEA EA Chapters 14–15 and the 2025 SNA implementation strategy's staged approach (scoping, adaptation, estimation, follow-up) informs both the rubric design and the phased pathway in Section 3.2.
2. ¶2 United Nations. (2025). *The Global Statistical Geospatial Framework*, 2nd edition. UN Committee of Experts on Global Geospatial Information Management (UN-GGIM).
3. ¶3 Trueb, L., Gacutan, J., Praphotjanaporn, T., Alarcon Blazquez, M., and Milligan, B. (2024). 'Identifying the institutional modalities for commencing Environmental-Economic Accounting for the ocean'. *Marine Policy* 106410. doi:10.1016/j.marpol.2024.106410.
4. ¶4 SEEA EA recommends IUCN GET level 3 as the default spatial reference framework (SEEA EA paras. 3.27–3.34). Finer resolution (level 4, regional ecotype) may be required for sub-national or thematic accounts. Coarser resolution is insufficient for SEEA-compliant extent accounts. See [TG-2.1 Aggregate Biophysical Indicators of Environmental State](#) for ecosystem extent account compilation guidance.
5. ¶5 Asset accounts valued by net present value require a discount rate. The Technical Guidance does not prescribe one. See [TG-1.9 Safe Usage of Monetary Valuation](#) for discount-rate selection and sensitivity testing, and [TG-0.2 Overview of Relevant Statistical Standards](#) for the SEEA EA treatment of discount rates.
6. ¶6 United Nations Economic and Social Commission for Asia and the Pacific. (2021). *Ocean Accounts: Piloting the SEEA EEA for the Ocean*, Chapter 3.
7. ¶7 United Nations Economic and Social Commission for Asia and the Pacific. (2021). *Ocean Accounts: Piloting the SEEA EEA for the Ocean*, Chapter 4.
8. ¶8 United Nations Economic and Social Commission for Asia and the Pacific. (2021). *Ocean Accounts: Piloting the SEEA EEA for the Ocean*, Vietnam case study.
9. ¶9 United Nations Economic and Social Commission for Asia and the Pacific. (2021). *Ocean Accounts: Piloting the SEEA EEA for the Ocean*, country scoping reports.
10. ¶10 Full references: Inter-secretariat Working Group on National Accounts (2025), *Strategy for Implementing 2025 SNA and BPM7*; PARIS21 (2018), *Guidelines for NSDS preparation*; United Nations (2019), *UN National Quality Assurance Frameworks Manual*, Studies in Methods Series M No. 100; United Nations (2021), *SEEA EA*; United Nations (2021), *SEEA EA Implementation Guide*; United Nations (2025), *GSGF* 2nd edition.

Ocean Accounting and the Blue/Ocean Economy

The entry point to Section 1: what ocean accounts can tell a government about its ocean economy, the difference between the ocean, marine and blue economy vocabularies, what an account can and cannot certify about a blue economy claim, and where in this guidance each policy question is answered.

Version	0.2.0	Status	Draft	Stability	Applied
Last updated	September 2026	Responsible officer	Dr Jordan Gacutan		

Drafting AI-assisted drafting from GOAP Secretariat source materials; source list to be published at the close of consultation.

OUTCOME

Governments usually come to ocean accounting with a question rather than a method: how much of the national economy depends on the ocean, who earns from it, and whether that earning is drawing down the assets it rests on. This Circular is the entry point to Section 1. It sets out what ocean accounts can tell a government about its ocean economy, in what terms, and where each answer is produced.

Much of the difficulty at this stage is not technical. Ocean economic activity is described in at least four vocabularies – ocean economy, marine economy, blue economy and sustainable ocean economy – used interchangeably in public but meaning different things in an account, and national programmes draw the boundary of that activity differently, for reasons that are largely legitimate. A figure compiled on one set of choices and quoted under another will not carry the weight later placed on it; where that has happened, the remedy is documentation rather than withdrawal. After reading this Circular, you will be able to say which term fits a given policy purpose, tell a measured ocean economy aggregate from a blue economy commitment, find which account and which indicator answer a question you are being asked, and put a short set of questions to any published figure before it appears in a submission.

The account behind these answers is [TG-3.3 Economic Activity Relevant to the Ocean](#); the indicators derived from it are [TG-2.5 Structure and Function of the Ocean Economy](#); the individual decisions are the other circulars of Section 1.

CONTENTS

1. Outcome 3

2. Requirements 3

3. Guidance Material 4

 3.1 Why this is difficult before it is technical 4

 3.2 The terms and what they commit you to 4

 3.3 What ocean accounts can and cannot certify 5

 3.4 What changes once the account exists 6

 3.5 What it takes, and who has to be involved 7

 3.6 How national programmes have drawn the line 7

 3.7 Reading an ocean economy number 7

4. Acknowledgements 8

5. References 8

ABOUT THIS CIRCULAR

RECOMMENDED CITATION

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DRAFT

1. Outcome

¶1 Governments usually come to ocean accounting with a question rather than a method: how much of the national economy depends on the ocean, who earns from it, and whether that earning is drawing down the assets it rests on. This Circular is the entry point to Section 1. It sets out what ocean accounts can tell a government about its ocean economy, in what terms, and where each answer is produced.

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¶4 The account behind these answers is **TG-3.3 Economic Activity Relevant to the Ocean**; the indicators derived from it are **TG-2.5 Structure and Function of the Ocean Economy**; the individual decisions are the other circulars of Section 1.

2. Requirements

¶1 This Circular assumes familiarity with:

- ¶2 **TG-0.1 General Introduction to Ocean Accounts**, for the conceptual framework, the account types referred to throughout, and the case for ocean accounts in general
- ¶3 **TG-0.2 Overview of Relevant Statistical Standards**, for the statistical standards that govern what an account may assert

¶4 **TG-3.3** and **TG-2.5** are referred to throughout and are useful alongside this Circular, though neither is a prerequisite. Readers new to the publication may prefer to begin with **TG-0.5 Navigating the Technical Guidance**, which sets out reading pathways by role.

¶5 ⓘ Framework Position

¶6 This Circular is a framing circular for Section 1. It does not compile an account or derive an indicator. It establishes the terms in which ocean economic activity is discussed, the limits of what the accounts covering that activity can support, and the route from a policy question to the circular that answers it. The accounts it refers to sit on Edge E3 of the Ocean Accounts Framework (TG-0.1 Figure 0.1.2):

Edge	Direction	Description
E3	FG1 ↔ SG1	Monetary and physical flows between economic sectors and SNA assets – supply and use tables, capital formation, depreciation, balance sheet changes

¶7 **Scope.** TG-1.0 owns the terminology of ocean economy measurement, the limits of what an ocean account can certify about a blue economy claim, and the map from ocean economy policy questions to the accounts and indicators that answer them. It cross-refers to **TG-3.3** for the boundary decision, the ISIC and CPC concordance and the supply and use table; to **TG-2.5** for every indicator; and to **TG-1.1**, **TG-1.7**, **TG-1.8**, **TG-1.10** and **TG-1.12** for the individual decisions.

¶8 **What it does not do.** It does not introduce ocean accounts (TG-0.1 Section 3.2), assess whether a country is in a position to compile them (**TG-0.8 Implementation Readiness**), or route readers through the publication as a whole (TG-0.5 Section 5). It carries no compilation method and no worked figures.

3. Guidance Material

3.1 Why this is difficult before it is technical

¶1 The measurement problem in this Circular is usually met in a particular moment: a budget hearing at which an allocation to ocean management has to be defended with a number; a development finance institution asking what a blue bond's proceeds will be measured against; a development plan that has already adopted a blue economy target; a report against SDG 14. In each, a figure is required faster than an account can be compiled, and something is usually to hand. Two features of the field make that figure harder to rely on than it appears.

¶2 **The vocabulary is split along a line worth naming.** Statistical agencies name a measured baseline, whilst development bodies name an aspiration.¹ Both usages are established and neither is wrong, but they are not interchangeable, and a document that moves between them without saying so is claiming more than it has measured. Section 3.2 sets out the terms and what each commits a publisher to.

¶3 **Scope varies between countries, for good reasons.** A review of 35 national ocean account definitions identified over 50 candidate industries, with inclusion rates ranging from 96 per cent for commercial fishing to under 10 per cent for specialised services.² The spread reflects differences in economic composition, data availability and policy purpose, which is why this guidance documents the choices made in each case and does not prescribe one. It does mean that two published national figures are rarely measuring the same thing. Section 3.6 sets out how three programmes have drawn the line.

¶4 Neither feature is a reason to wait. Both are reasons to record, alongside any published figure, which term it uses and which boundary it was compiled on: the disclosure rule in Section 3.2, and the checklist in Section 3.7.

3.2 The terms and what they commit you to

¶1 Statistical agencies (OECD, NOAA) use *ocean economy*, and nationally *marine economy*, for the measured baseline of all ocean-related activity. Development bodies (World Bank, UN) use *blue economy* or *sustainable ocean economy* for a framework that couples growth with environmental stewardship and social equity. Where a figure compiled as an ocean economy aggregate is published as a blue economy figure, the label claims more than the evidence behind it: the account has not tested sustainability, equity or inclusion, and the blue economy term asserts all three. Table 1 sets out the distinctions adopted across this Technical Guidance.

¶2 **Table 1: Terms describing ocean and coastal economic activity**

Term	Definition adopted	Primary source
Ocean economy	The sum of the economic activities of ocean-based industries, together with the assets, goods and services provided by marine ecosystems. Used throughout this Technical Guidance as the conceptual scope of the thematic and extended accounts in TG-3.3 .	OECD (2016) ³ ; NOAA (LeBoeuf et al. 2024) ¹
Marine economy	A national statistical realisation of the ocean economy concept within a defined geographical scope (e.g. the U.S. Marine Economy Satellite Account, which includes the Great Lakes). Not a distinct concept.	NOAA (LeBoeuf et al. 2024) ¹
Blue economy	The sustainable, equitable and socially inclusive use of ocean resources to benefit economies, livelihoods, and ecosystem health. An aspirational frame requiring that growth reconcile with environmental protection and social equity.	World Bank & UNDESA (2017) ⁴ ; UN (2014) ⁵

Term	Definition adopted	Primary source
Sustainable ocean economy	Substantively equivalent to the blue economy; framed as an action agenda linking effective protection, sustainable production, and equitable prosperity.	High Level Panel (2020) ⁶
EU blue economy	All established and emerging sectoral and cross-sectoral economic activities based on or related to oceans, seas, and coasts, used as a target framework for the EU green transition.	European Commission ⁷
Ocean enterprise	All entities providing infrastructure and capacity for ocean observation, measurement and forecasting, or delivering operational ocean information products and services. Captured within ocean economy accounts through the relevant ISIC classes; see TG-3.3 Section 3.4.	NOAA (LeBoeuf et al. 2024) ¹
New blue economy	Emphasises the growing role of the ocean enterprise within the blue economy. Not a separate accounting boundary.	NOAA (LeBoeuf et al. 2024) ¹

¶3 Two of these are not separate accounting boundaries and should not be treated as such. *Marine economy* is a national realisation of the ocean economy concept, and *new blue economy* is an emphasis within the blue economy. Neither implies a different table.

¶4 **The disclosure rule.** A published ocean economy account should state which term it uses and the definitional source for that term. Cross-country comparison is not otherwise interpretable, and the accounting framework in **TG-3.3** can accommodate different definitional choices provided the scope and boundaries adopted are documented. The term is part of the metadata, not a title.

3.3 What ocean accounts can and cannot certify

¶1 The distinction between the two vocabularies has a precise consequence for what a government may assert on the strength of its accounts.

¶2 **What the accounts support.** Compiled under **TG-3.3** and presented under **TG-2.5**, an ocean economy account supports statements about ocean economy gross value added, employment, exports and gross fixed capital formation on an SNA basis; net ocean GVA after the depletion of marine natural resources; and the volume of finance classified as sustainable ocean finance under **TG-2.6** and tagged under **TG-1.12**.

¶3 **What they do not support.** None of the above certifies that the activity measured is sustainable, equitable or socially inclusive – which is what the blue economy vocabulary asserts. The sustainability-related extensions, net ocean GVA and depletion adjustment among them, *support* blue economy reporting but do not by themselves constitute a blue economy account. A depletion adjustment establishes that natural capital was drawn down and by how much; it does not establish that the remaining drawdown is within a sustainable rate. That judgement requires the condition and asset accounts of **TG-3.1**, the ecosystem service flows of **TG-3.2**, and the thresholds in **TG-1.4 OA and Sustainable Ocean Planning**. Equity and inclusion require the social accounts of **TG-3.5**. Labelling an ocean economy aggregate a blue economy figure does not import those findings.

¶4 **Why headline figures are rarely comparable.** Published claims of the form “the blue economy is worth X” are routinely compared across countries when they are not comparable. Four differences account for most of it, and a reader can check each:

- ¶5 **The boundary.** The seaward boundary is normally the Exclusive Economic Zone, but the inland boundary is a national choice – distance from the shoreline, the extent of the coastal zone, whether estuaries, deltas and large inland waters are included. Differences in that choice are a primary source of cross-country non-comparability. See **TG-3.3** Section 3.2.
- ¶6 **The measurement basis.** **TG-3.3** Section 3.2 sets out seven categories of ocean-related activity. Categories 1 to 4 are SNA-comparable; categories 5 to 7 extend the measurement bound-

ary to ecosystem service values, supply-chain linkages and induced demand. The two groups are measured on different bases and **cannot be added**: the second captures value outside the SNA production boundary, or value already counted within the first. A total across both is not a national accounts aggregate, whatever it is titled. Where both are of interest, they are reported as two figures.

3. ¶7 **The ocean ratio.** For industries only partly ocean-related, the ocean share is estimated, by methods ranging from an establishment survey to structured expert judgement. TG-3.3 Section 3.4 requires the estimation level to be recorded per industry: a figure resting largely on level 4 estimates carries a different weight from one resting on level 1.
4. ¶8 **Gross or net.** Gross ocean GVA and net ocean GVA after depletion answer different questions, and the gap between them is the policy-relevant quantity for a country whose ocean industries draw on natural capital.

3.4 What changes once the account exists

¶1 An ocean economy account earns its cost where a decision turns on it. Four cases are common. A budget submission for ocean management, fisheries governance or port infrastructure can be defended with the sector's measured contribution to national income, employment and revenue, and not with an assertion of importance (TG-1.1). A blue bond or concessional finance facility acquires a use-of-proceeds definition and an impact report that a third party can verify (TG-2.6, TG-1.7, TG-1.8). A blue economy target in a development plan acquires a measurable baseline and a reporting series (TG-1.10). And economic exposure to a fisheries or climate shock can be assessed before the shock arrives, which matters most for Small Island Developing States and coastal low-income countries, where fisheries may account for a substantial share of GDP and of export earnings⁸ (TG-2.2, TG-1.5).

¶2 Table 2 routes each recurring question to the account that produces the evidence, the indicator that presents it, and the circular covering the decision that uses it.

¶3 **Table 2: Ocean economy policy questions, and where each is answered**

The question	The account	The indicator	The decision
What share of GDP is the ocean economy?	TG-3.3 Section 3.5	TG-2.5 Section 3.2	TG-1.1
How many jobs depend on it, and of what quality?	TG-3.3 Section 3.5	TG-2.5 Section 3.5	TG-1.1, TG-1.10
Is growth drawing down natural capital?	TG-3.1, TG-3.3 Section 3.5	TG-2.5 Section 3.4	TG-1.4, TG-1.10
What is being invested, and in what?	TG-3.3 Section 3.6	TG-2.6	TG-1.7, TG-1.8
What is government spending on the ocean?	TG-3.7 Section 3.3.5	TG-2.13	TG-1.1, TG-1.12
How exposed are we to a fisheries shock?	TG-3.2, TG-3.3 Section 3.5	TG-2.2	TG-1.5, TG-1.10
Are we meeting SDG 14 and other MEA commitments?	TG-3.3 Section 3.5	TG-2.10	TG-1.10

¶4 The indicator in the third column is available only where the account in the second has been compiled. Where it has not, the position to state is that the figure is not yet available. A number

drawn from another source is not the indicator it stands in for, and the difference is ordinarily found by the reader who checks it. **TG-0.8 Implementation Readiness** sets out the capability each column assumes.

3.5 What it takes, and who has to be involved

¶1 Two questions follow immediately from Table 2. Both belong to **TG-0.8**, and both shape whether the work is commissioned at all.

¶2 **How much has to be built.** Where a country already has functioning national accounts and business statistics, a first ocean economy aggregate is largely a rearrangement of data the statistical office holds: the thematic account disaggregates existing national accounts, and does not create a new collection, whilst TG-0.8 Section 3.2 treats this as the recommended entry point in that situation. Extending the boundary to ecosystem service values is a different proposition, and belongs to a later phase. Countries with limited statistical infrastructure have other entry points, and TG-0.8 Section 3.2 routes between them.

¶3 **Who has to be involved.** The aggregate is compiled by the national statistical office, but two of the decisions behind it are not statistical. The boundary – which industries count, and how far inland – is a policy choice with distributional consequences, properly settled with the ministries whose sectors it includes or excludes (**TG-3.3** Section 3.2). Classifying expenditure as ocean-related is a change to a finance ministry's own systems (**TG-1.12**). TG-0.8 Section 3.5 sets out institutional arrangements for that division of work.

3.6 How national programmes have drawn the line

¶1 There is no single agreed scope for the ocean economy. The sectors consistently included across national programmes are living resources, minerals and oil and gas, marine construction, tourism and recreation, shipbuilding and repair, marine energy, marine research and education, government and public administration, and marine services. Beyond that core, programmes differ. Table 3 sets out three, and the reason each differs.⁹

¶2 **Table 3: Three national approaches to ocean economy scope**

Country	Approach
Portugal	Applies a value-chain approach across three tiers, excludes purely spatial criteria to avoid overstating the ocean component, and includes emerging sectors such as marine biotechnology, R&D, maritime finance, and maritime governance.
United States	Applies geographic-functional criteria: activities occurring on ocean waters, requiring ocean access or adjacency, or producing outputs intended for ocean use.
Norway	Adopts the OECD 7-activity-type definition with explicit emphasis on knowledge-intensive services, marine R&D, and innovation investment.

¶3 The classification structure a country selects should reflect its economic composition, data availability and policy goals, consistent with the principles of national accounting. The consequence to draw is not that one of these is correct: it is that **the metadata is what makes a published figure readable, not the figure**. Two countries reporting the same ocean share of GDP on different scopes have not reported the same thing.

¶4 A country benchmarking its own approach has two standing international comparators: the European Commission's annual *EU Blue Economy Report*, which measures ocean economy sectors across EU member states using Eurostat structural business statistics⁷, and the OECD's work on ocean economy measurement³. The framework in **TG-3.3** remains the primary methodological reference for this Technical Guidance.

3.7 Reading an ocean economy number

¶1 A reader handed a published ocean economy figure – in a budget submission, a development plan, an investment prospectus or a press release – can establish the following before citing it. This is the reader's counterpart to the metadata requirements a compiler satisfies under **TG-3.3**.

Check	What to establish	Where the answer should be
Term	Which of the terms in Table 1 the figure uses, and its definitional source	Metadata, per Section 3.2
Boundary	The seaward and, critically, the inland boundary; whether inland waters are included	TG-3.3 Section 3.2
Basis	Whether the figure is confined to the SNA-comparable core (TG-3.3 categories 1 to 4), or extends beyond it – and whether the two have been added together	TG-3.3 Section 3.2
Industry scope	Which ISIC classes are included, and whether emerging sectors are reported separately	TG-3.3 Section 3.4
Ocean ratio	For partial industries, the estimation level used, recorded per industry	TG-3.3 Section 3.4
Gross or net	Whether depletion of marine natural resources has been deducted	TG-2.5 Section 3.4
Derivable	Whether the aggregate can be derived from published supply and use tables	TG-3.3 Section 3.5

¶2 Where these cannot be established, the figure will not bear comparison with another country's, and a submission resting on that comparison is exposed. It may still be sound for domestic trend analysis, provided the same choices were applied in each period, which is worth confirming before the series is used.

¶3 Many countries already have a published ocean or blue economy figure in a plan, a prospectus or a ministerial statement, compiled before any of this was settled. Such a figure does not have to be withdrawn. It has to be documented: run it against the checklist, record what can be established and what cannot, and state the term and boundary it was compiled on when the figure is next used. Most national programmes begin from exactly that position.

4. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

5. References

- ¶1 LeBoeuf, N., R.F. Rayner, C. Gouldman, Z. Baize, M. Grasso, B. Croll and K. Quigley (2024). "Terminology Related to Ocean and Coastal Economic Activity." *Journal of Ocean and Coastal Economics* 11(1), Article 1. DOI: <https://doi.org/10.15351/2373-8456.1189> (<https://doi.org/10.15351/2373-8456.1189>). Defines and distinguishes ocean economy, marine economy, blue economy, ocean enterprise and new blue economy as used by NOAA, drawing on OECD (2016) and World Bank (2017).
- ¶2 Colgan, C.S. (2022). *A Guide to Creating Core Ocean GDP Accounts*. Global Ocean Accounts Partnership. Available at: <https://www.oceanaccounts.org/a-guide-to-creating-core-ocean-gdp-accounts/> (<https://www.oceanaccounts.org/a-guide-to-creating-core-ocean-gdp-accounts/>)
- ¶3 OECD (2016). *The Ocean Economy in 2030*. Paris: OECD Publishing. DOI: <https://doi.org/10.1787/9789264251724-en> (<https://doi.org/10.1787/9789264251724-en>). Establishes the industry-plus-ecosystem-services definition of the ocean economy adopted in this Circular.
- ¶4 World Bank and United Nations Department of Economic and Social Affairs (2017). *The Potential of the Blue Economy: Increasing Long-term Benefits of the Sustainable Use of Marine Resources for Small Island Developing*

States and Coastal Least Developed Countries. Washington, D.C.: World Bank. Establishes the development-context definition of the blue economy requiring economic growth to be coupled with environmental preservation and social equity.

5. ¶5 United Nations (2014). *Blue Economy Concept Paper*. Released ahead of the UN Sustainable Development Summit; framed the blue economy as a macroeconomic tool for poverty eradication and sustainable development, subsequently embedded in SDG 14.
6. ¶6 High Level Panel for a Sustainable Ocean Economy (2020). *Transformations for a Sustainable Ocean Economy: A Vision for Protection, Production and Prosperity*. Sets out the action agenda linking effective protection, sustainable production, and equitable prosperity, including the “100% Commitment” to sustainable management of national waters.
7. ¶7 European Commission (annual). *The EU Blue Economy Report*. Luxembourg: Publications Office of the European Union. The report provides a comprehensive methodology for identifying and measuring ocean economy sectors using Eurostat structural business statistics and national accounts data.
8. ¶8 World Bank (2017). *The Sunken Billions Revisited: Progress and Challenges in Global Marine Fisheries*. Washington, D.C.: World Bank. For SIDS economic dependencies, see also UNCTAD (2020). *The Oceans Economy: Opportunities and Challenges for Small Island Developing States*. Geneva: UNCTAD.
9. ¶9 Global Ocean Accounts Partnership (2025). *Valuing the Ocean Economy: Lessons from Earlier Adopters*. GOAP Publication. Available at: <https://oceanaccounts.org/publications/valuing-the-ocean-economy-lessons-from-earlier-adopters/> (<https://oceanaccounts.org/publications/valuing-the-ocean-economy-lessons-from-earlier-adopters/>)

DRAFT

OA and National Budget Processes

Sets out which accounts and indicators feed budget decisions, and how to construct budget submissions using ocean accounting data.

Version 0.8.1

Status Draft

Stability Applied

Last updated September 2026 **Responsible officer** Dr Jordan Gacutan

Drafting AI-assisted drafting from GOAP Secretariat source materials; source list to be published at the close of consultation.

OUTCOME

Readers will learn which accounts and indicators feed budget decisions, how to read them, and how to present the economic case for public investment in marine resource management and ecosystem conservation. This Circular does not set out how the underlying accounts are compiled: it names the indicator, points to the circular that produces it, and addresses what a finance ministry does with the result.

The guidance addresses three budget use cases:

- Natural capital budgeting uses asset accounts to quantify the value of ocean assets and changes in that value, so that governments can assess whether economic growth is achieved at the expense of depleting marine natural capital. Finance ministries can use depletion-adjusted net domestic product (NDP) calculations to demonstrate the natural capital cost of unsustainable fishing or offshore extraction, and to support budget allocations for resource management.
- Medium-term expenditure framework (MTEF) development requires multi-year projections of ocean economy contributions and asset trajectories. Asset accounts enable projection of fish stock biomass under alternative management scenarios, whilst ecosystem extent accounts track whether mangrove restoration investments will meet MTEF targets for coastal protection services.
- Budget line-item justification for fisheries enforcement, marine protected area management, or coastal infrastructure requires presenting sector economic contribution, asset status and trends, and expected returns to public expenditure.

The quantitative evidence from ocean accounts strengthens these requests by grounding them in internationally standardised data.

Sections 3.3 and 3.4 also set out what a budget official should ask about the figures before relying on them: how the ocean ratio underlying the GVA estimate was derived, whether product taxes and subsidies were extracted or allocated, what the depletion measure covers and what it omits, and whether government rent receipts have been reconciled against it. Those questions are what determine whether a submission survives scrutiny.

CONTENTS

1. Outcome 3

2. Requirements 3

3. Guidance Material 4

 3.1 Ocean accounts and fiscal planning 4

 3.2 From accounts to budget decisions: which data feed fiscal planning 4

 3.3 Quantifying ocean contributions to national income 6

 3.4 Net ocean GVA: accounting for natural capital depletion 8

 3.5 Building budget requests using ocean data 9

 3.6 Integration with MTEF and annual budgets 12

 3.7 Government expenditure on ocean-related functions 12

 3.8 Ocean ecosystem assets in fiscal frameworks 13

4. Acknowledgements 14

5. References 14

ABOUT THIS CIRCULAR

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DRAFT

¶1 ⓘ Framework Position

¶2 TG-1.1 sits within Section 1 (Decision-Making) of the GOAP Technical Guidance and provides the fiscal planning bridge between ocean accounts compilation (Sections 3-6) and policy use. It draws on asset accounts (TG-3.1), economic activity accounts (TG-3.3), and government expenditure accounts (TG-3.8) to demonstrate to budget officials how ocean accounting data can inform national budget submissions, MTEF projections, and natural capital budgeting.

1. Outcome

¶1 Readers will learn which accounts and indicators feed budget decisions, how to read them, and how to present the economic case for public investment in marine resource management and ecosystem conservation. This Circular does not set out how the underlying accounts are compiled: it names the indicator, points to the circular that produces it, and addresses what a finance ministry does with the result.

¶2 The guidance addresses three budget use cases:

- ¶3 **Natural capital budgeting** uses asset accounts to quantify the value of ocean assets and changes in that value, so that governments can assess whether economic growth is achieved at the expense of depleting marine natural capital. Finance ministries can use depletion-adjusted net domestic product (NDP) calculations to demonstrate the natural capital cost of unsustainable fishing or offshore extraction, and to support budget allocations for resource management.
- ¶4 **Medium-term expenditure framework (MTEF) development**¹ requires multi-year projections of ocean economy contributions and asset trajectories. Asset accounts enable projection of fish stock biomass under alternative management scenarios, whilst ecosystem extent accounts track whether mangrove restoration investments will meet MTEF targets for coastal protection services.
- ¶5 **Budget line-item justification** for fisheries enforcement, marine protected area management, or coastal infrastructure requires presenting sector economic contribution, asset status and trends, and expected returns to public expenditure.

¶6 The quantitative evidence from ocean accounts strengthens these requests by grounding them in internationally standardised data.

¶7 Sections 3.3 and 3.4 also set out what a budget official should ask about the figures before relying on them: how the ocean ratio underlying the GVA estimate was derived, whether product taxes and subsidies were extracted or allocated, what the depletion measure covers and what it omits, and whether government rent receipts have been reconciled against it. Those questions are what determine whether a submission survives scrutiny.

2. Requirements

- ¶1 **TG-0.1 General Introduction to Ocean Accounts** – provides foundational understanding of Ocean Accounts structure, including the distinction between stocks and flows, the relationship to the System of National Accounts (SNA) and System of Environmental-Economic Accounting (SEEA), and the multiple-capitals framework for wellbeing and sustainability
- ¶2 **TG-3.7 Governance Accounts** – provides the environmental activity account tables and the COFOG and CEPA/CRMA expenditure classifications used in Section 3.7 of this Circular to identify and track ocean-related government expenditure, together with the accounting boundary between governance expenditure and governance revenue (TG-3.7 Section 3.3.5)

¶3 Readers approaching Section 1 for the first time should begin with **TG-1.0 Ocean Accounting and the Blue/Ocean Economy**, the framing circular for the section, which sets out the ocean

economy terminology used throughout, what an ocean account can and cannot certify about a blue economy claim, and the map from a policy question to the circular that answers it. It is recommended reading, not a prerequisite.

3. Guidance Material

3.1 Ocean accounts and fiscal planning

¶1 National budget processes typically follow an annual cycle comprising budget formulation, legislative approval, execution, and audit. In many countries, annual budgets operate within a Medium-Term Expenditure Framework (MTEF) that projects revenues and expenditures over a three-to-five year horizon. Ocean Accounts can inform both the annual and medium-term dimensions of fiscal planning by providing consistent, comparable data on (1) the contribution of ocean-related sectors to national production and income, (2) the stocks of natural capital assets in marine and coastal areas, (3) the flows of ecosystem services from ocean environments, and (4) the depletion or enhancement of marine resource assets over time.

¶2 The 2025 SNA gives increased prominence to net income measures² and now treats depletion of natural resources as a cost of production alongside depreciation³. Net Domestic Product (NDP) subtracts both depreciation and depletion from GDP, and is identified as the conceptually preferred measure of economic growth for sustainability purposes⁴. For ocean-rich countries, this change has direct implications for fiscal planning: the extraction of marine resources such as fish stocks or seabed minerals now affects measured net income, and budget planners gain a clearer indication of the sustainability of resource-dependent revenue streams.

¶3 Most countries currently compile national accounts under SNA 2008, which does not treat depletion as a cost of production. Depletion-adjusted ocean GVA measures prepared using this Circular should be presented as ocean accounts supplementary measures, clearly distinguished from official GDP and NDP. This framing is consistent with the SEEA Central Framework supplementary account approach⁵ and avoids pre-empting national statistical office SNA 2025 transition timelines.⁶

3.2 From accounts to budget decisions: which data feed fiscal planning

¶1 Four Ocean Accounts modules feed the three calculation steps that translate accounts into budget evidence: the depletion adjustment, ecosystem service valuation, and expenditure classification. Figure 1.1.1 maps these many-to-many linkages.

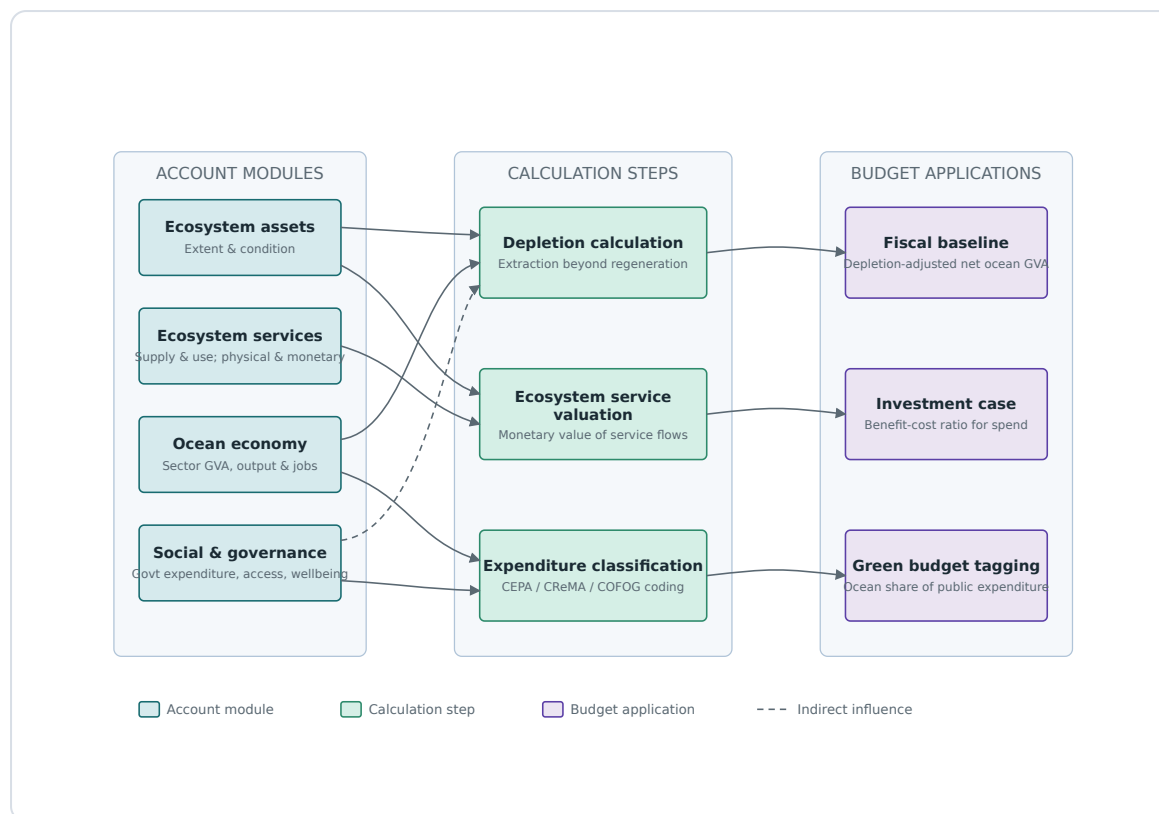


Figure 1.1.1 Four Ocean Accounts modules feed three calculation steps that support three budget applications. Stage colours mark account inputs, calculation steps, and budget applications; edges are many-to-many.

Source: TG-1.1 §3 (account-to-budget mapping); §3.4 (net ocean GVA / depletion); §3.7 (CEPA / CReMA / COFOG expenditure classification). Modules per TG-3.1 (assets), TG-3.2 (services), TG-3.3 (ocean economy), TG-3.8 (government activity).

Adapted from: SNA 2025 Ch.15 & Ch.22 (depletion as a cost of production; government finance interface); OECD (2022) Green Budgeting Framework.

Asset accounts feed natural capital budgeting

¶1 Asset accounts provide the quantitative foundation for assessing whether ocean economic growth is sustainable or whether it draws down marine natural capital. Three specific account entries are particularly relevant:

¶2 **Physical fish stock accounts** (TG-3.1 Section 3.4.1) record opening stock, natural growth, gross catch, natural mortality, and closing stock in tonnes of biomass. Depletion is derived as gross catch minus sustainable yield, and indicates whether extraction exceeds regeneration⁷. A fisheries ministry budget submission can state: “Commercial fish stocks declined from 180,000 tonnes to 176,800 tonnes during 2025, with catch of 24,000 tonnes exceeding sustainable yield of 22,000 tonnes by 2,000 tonnes, indicating depletion. Stabilising stocks requires increased management expenditure of USD X million annually.” This statement draws directly from the physical asset account structure in TG-3.1 Table 1.

¶3 **Monetary fish stock accounts** (TG-3.1 Section 3.3) translate physical depletion into monetary terms by multiplying depletion in tonnes by the resource rent per tonne. If resource rent is USD 450 per tonne and depletion is 2,000 tonnes, the monetary value of depletion is USD 900,000. This figure should be deducted from gross ocean GVA to calculate net ocean GVA for inclusion in MTEF projections. The calculation procedure is specified in Section 3.4 below.

¶4 **Ecosystem asset accounts** (TG-3.1 Section 3.5) record the extent and condition of marine ecosystems that provide coastal protection, carbon sequestration, and other services relevant to budget decisions. If mangrove extent declined by 3.2 km² during 2025 (TG-3.1 Table 5), and each hectare provides coastal protection services valued at USD 12,000 per year (TG-3.1 worked exam-

ple), the annual loss of coastal protection capacity is USD 3.84 million (320 hectares × USD 12,000). This figure can justify budget requests for mangrove restoration by quantifying the replacement value of protection services that have been lost.

Ocean economy accounts feed sector contribution evidence

¶1 Ocean economy thematic accounts compiled under **TG-3.3 Economic Activity** provide the data to demonstrate the ocean sector's contribution to national income, employment, and exports. The derivation procedure from supply and use tables (SUTs) to budget indicators is detailed in **TG-2.5** Section 3.7. The resulting indicators populate Table 1 in Section 3.3 below.

Flow accounts feed environmental expenditure tracking

¶1 Environmental activity accounts described in **TG-3.7 Governance Accounts** Section 3.3.5, and adapted for investment purposes in **TG-2.6 Ocean Investment** Section 3.2, enable tracking of government spending on ocean-related environmental activities. These accounts classify expenditure using the Classification of Environmental Protection Activities and Expenditure (CEPA) and the Classification of Resource Management Activities (CReMA)⁸. For budget purposes, the accounts identify:

¶2 **Marine protected area management expenditure** is classified under CEPA 6 (Protection of biodiversity and landscapes). A budget submission can state: "Government expenditure on marine protected area management totalled USD 8.2 million in 2025, protecting 72,000 hectares of marine ecosystems that provide USD 23 million annually in ecosystem services (coastal protection, carbon sequestration, fish nursery habitat)." The expenditure figure comes from functional accounts. The ecosystem service values come from ecosystem service flow accounts in **TG-3.2**.

¶3 **Fisheries management expenditure** is classified under CReMA resource management activities. A budget submission can compare management expenditure to the value at risk: "Fisheries management expenditure of USD 5.5 million protects an ocean fishing sector contributing USD 175 million GVA and employing 32,000 persons. Fish stock asset value is estimated at USD 73 million based on net present value of sustainable yield."

3.3 Quantifying ocean contributions to national income

¶1 An ocean economy thematic account disaggregates ocean-related economic activities that are often hidden within broader classifications in standard national accounts⁹. For the thematic and extended accounts framework (SNA 2025 Chapter 38), see **TG-0.2 Standards and Frameworks**. The ocean economy thematic account is a thematic account in the SNA 2025 sense: it disaggregates and rearranges items within the SNA integrated framework rather than expanding its boundaries.

¶2 The account identifies industries and products that are 'ocean-related', either because they take place in marine areas, use marine resources as inputs, or produce goods and services specifically for ocean activities¹⁰. The specific activities included will vary according to national circumstances. Countries with large exclusive economic zones may place greater emphasis on offshore extraction and deep-sea activities, whilst small island developing States may prioritise coastal tourism and artisanal fisheries. The SEEA Ecosystem Accounting framework provides guidance on defining ocean-related activities in Section 13.5, and the GOAP Technical Guidance encourages countries to document their classification choices transparently so that cross-country comparisons can account for differences in scope¹¹. The classification should be applied consistently over time so that trend data remain meaningful.

¶3 Key ocean-related activities typically include:

- ¶4 Marine fishing and aquaculture
- ¶5 Offshore mineral and energy extraction (including petroleum, natural gas, and emerging marine renewable energy)

- ¶6 Maritime transport (shipping, port services)
- ¶7 Shipbuilding and marine equipment manufacturing
- ¶8 Coastal tourism and recreation¹²
- ¶9 Marine and coastal construction
- ¶10 Ocean research and education

¶11 For each activity, the thematic account records output, intermediate consumption, gross value added, compensation of employees, and other standard economic variables. The sum of gross value added across all ocean-related activities provides a measure of the ocean economy's direct contribution to GDP.

Which indicators a budget submission needs, and where they come from

¶1 A budget official does not compile the ocean economy account. Four indicators are drawn from it, and Table 1 below is the format in which they are presented.

Indicator	What it establishes in a budget submission	Compiled in
Ocean economy direct GVA	The sector's contribution to national income, and its share of GDP	TG-2.5 Section 3.7
Ocean economy direct GDP	The same on a GDP basis, after the ocean share of taxes less subsidies on products	TG-2.5 Section 3.7
Ocean employment	Jobs at stake in the allocation decision, and the basis for cost-per-job comparisons	TG-2.5 Sections 3.5 and 3.7
Ocean exports	Foreign exchange exposure to the sector, relevant where fiscal projections depend on it	TG-2.5 Section 3.6

¶2 Two features of the compilation bear on how these figures should be read and defended, and a budget official should ask about both.

¶3 **The ocean ratio drives the result.** Industries that are only partly ocean-related – coastal accommodation, marine construction, parts of transport – enter the account scaled by an estimated share. TG-2.5 Section 3.7 Step 3 sets a preference order for estimating that share, from establishment surveys through statistical proxies to documented expert judgement. Where the ratio for a large industry rests on expert judgement, the resulting GVA figure carries a correspondingly wide range, and a budget submission is stronger for stating the range than for presenting a point estimate that will not survive scrutiny.¹³

¶4 **Product taxes and subsidies are allocated, not observed.** Where the ocean share of taxes less subsidies on products is allocated proportionally rather than extracted directly, subsidised sectors are understated – fuel tax rebates for commercial fishing are the common case. A submission arguing about the fiscal cost or benefit of a sector should establish which method was used before relying on the GDP figure.¹⁴

Budget presentation table

¶1 Table 1 presents the standard format for presenting ocean economy contribution in national budget submissions. This format implements the four-row structure specified in Section 3.3 of this Circular and is populated using the indicators derived in Steps 4–6 above.

¶2 **Table 1: Ocean economy contribution – budget presentation format**

Indicator	Ocean economy	National total	Ocean share (%)
GDP contribution (USD million)	1,750	50,000	3.5
Employment (thousand persons)	300	10,000	3.0
Exports (USD million)	620	12,000	5.2
Fish protein supply (thousand tonnes)	285	340	83.8

¶3 *Note: Values are illustrative synthetic data for a medium-income coastal state. Compilers should replace these with data derived from national ocean accounts following the compilation procedure described above.*

¶4 The fish protein supply row represents total marine fish supply available for human consumption. This figure is derived conceptually as total marine fish catch, less exports of fish products and non-food uses (fishmeal, industrial use), multiplied by a species-mix-weighted protein conversion factor. Compilers should refer to FAO food balance sheet methodology for the operational procedure and FAO food composition tables for protein conversion factors.¹⁵ Where fish constitutes a major share of national protein consumption, this indicator demonstrates the ocean sector's contribution to food security and can justify budget allocations for fisheries management that maintain this contribution.

3.4 Net ocean GVA: accounting for natural capital depletion

¶1 Gross measures of ocean economy value added do not account for the depletion of the marine natural resources on which many ocean industries depend. **TG-2.5** Section 3.4 defines net ocean GVA and specifies which depletion categories enter it¹⁶; **TG-3.1 Asset Accounts** Section 3.4.1 and **TG-6.7 Fisheries Accounting: Integrating Stock Assessment** Section 3.3 set out how physical depletion is derived from the asset accounts and valued at resource rent.¹⁷ This Circular takes those figures as given and addresses what a finance ministry does with them.

¶2 Two boundary points determine whether the number can be defended in a budget process.

¶3 **Coverage is partial, and the gap runs one way.** Net ocean GVA as currently specified nets off depletion of fish stocks and of seabed minerals. It does not net off degradation of coastal and benthic habitat – trawl damage, coral bleaching, seagrass loss – which is a decline in ecosystem asset value rather than resource depletion and is accounted separately under TG-3.1 Section 3.5. A reef-dependent or trawl-intensive economy that presents net ocean GVA without noting this will understate its natural capital costs, and should disclose the omission explicitly rather than leave it to be discovered.¹⁸

¶4 **The measure is supplementary until the SNA 2025 transition completes.** Most countries still compile national accounts under SNA 2008, which does not treat depletion as a cost of production. Depletion-adjusted measures should be presented as ocean accounts supplementary measures, clearly distinguished from official GDP and NDP, consistent with the SEEA Central Framework supplementary account approach.⁶ Presenting them as adjustments to headline national accounts pre-empts the national statistical office's transition timetable and invites the figure to be rejected on procedural grounds.

¶5 **Reconciling with government revenue.** Only part of the resource rent that underlies the depletion valuation accrues to government as access payments or royalties. Where those receipts also appear in the governance revenue tables (**TG-3.7** Table 3.7.10b), the two must be reconciled rather than added: presenting government rent receipts alongside a depletion-adjusted net income measure without reconciliation double counts the same flow.¹⁹

Budget application of net measures

¶1 The difference between gross and net ocean GVA indicates the extent to which the ocean economy's recorded economic contribution depends on the drawdown of natural capital. Finance ministries can use this information to assess:

- ¶2 Whether ocean sector growth rates are sustainable or are achieved by depleting assets
- ¶3 The fiscal sustainability of revenue streams dependent on resource extraction
- ¶4 The magnitude of management investment required to stabilise stocks and protect future income flows

¶5 For MTEF purposes, projected net ocean GVA under alternative policy scenarios provides a more realistic basis for revenue forecasting than gross measures alone. If current depletion rates continue, the annual natural capital cost recorded in the accounts will grow and erode the sector's net contribution. Budget submissions can state: "Stabilising fish stocks to eliminate depletion would protect USD 900,000 annually in natural capital value, requiring estimated management expenditure of USD 2.5 million annually. The USD 900,000 in avoided annual depletion represents a direct return of 36 cents per dollar of management expenditure from natural capital preservation alone. When the broader economic benefits of maintaining the USD 175 million GVA fishing sector and 32,000 jobs are considered, the case for investment is substantially stronger."

3.5 Building budget requests using ocean data

Worked example: marine protected area expansion budget submission

¶1 This worked example demonstrates how to construct a complete budget submission for marine protected area (MPA) expansion using data from ocean accounts. The example uses synthetic data for a hypothetical coastal state seeking to expand MPA coverage from 15% to 30% of territorial waters over a three-year MTEF period, in line with global Target 3 of the Kunming-Montreal Global Biodiversity Framework.

¶2 **Context and policy objective:** The government seeks to expand marine protected area coverage from the current 15% (450 km² out of 3,000 km² territorial waters) to 30% (900 km²) by 2028. The Ministry of Environment prepares a budget submission for the MTEF 2026–2028 requesting USD 15 million capital expenditure for MPA establishment and USD 3 million annually for ongoing management.

¶3 **Step 1: Quantify ecosystem services from existing MPAs.** Using ecosystem service flow accounts (**TG-3.2**), the compilers estimate that existing MPAs provide:

- ¶4 Coastal protection services: 50 km of coastline protected, avoiding USD 8 million annually in storm damage
- ¶5 Carbon sequestration: 15,000 tonnes CO₂ sequestered annually, valued at USD 50/tonne = USD 750,000
- ¶6 Fish nursery habitat: Spillover effects support commercial fishing worth USD 5 million GVA annually
- ¶7 Tourism services: 80,000 visitor-days annually, generating USD 4 million in coastal tourism revenue

¶8 Total ecosystem service value from existing MPAs: USD 17.75 million annually. Per-hectare service value: USD 17.75 million / 45,000 hectares = USD 394 per hectare per year.

¶9 **Step 2: Project service benefits from MPA expansion.** Projecting benefits from MPA expansion requires accounting for the likelihood that additional areas will differ from existing MPAs in ecosystem condition and productivity. Where ecosystem condition accounts (**TG-3.1** Section 3.5 condition scores) are available for proposed expansion areas, compilers should weight the per-hectare service values by relative condition scores rather than applying a flat proportional scalar. Where condition data for expansion areas are unavailable, a marginal productivity discount is appropriate: the evidence indicates that MPA expansion into adjacent or lower-priority areas tends to yield below-average per-hectare service values²⁰. A discount of 70% of the existing per-hectare average is used as a working assumption in this example. That assumption must be disclosed, and a sensitivity analysis across 50–100% of the average per-hectare value should be presented alongside the central estimate. For guidance on spatial adjustment of service values, see **TG-1.9 Valuation**.

¶10 Applying a 70% marginal productivity factor: additional 45,000 hectares × USD 394/ha/yr × 0.70 = approximately USD 12.4 million in additional annual ecosystem services. For comparison, the

upper bound (100% factor, fully proportional) is USD 17.75 million, and the lower bound (50% factor) is USD 8.9 million.

¶11 **Step 3: Calculate net present value of benefits.** Using a 4% real discount rate consistent with **TG-1.9 Valuation** guidance, and assuming a 25-year planning horizon for management commitments:

¶12

$$\text{NPV of benefits} = \text{Annual service flow} \times \frac{1 - (1 + r)^{-n}}{r}$$

¶13 Where $r = 0.04$ and $n = 25$:

¶14 Central estimate: USD 12.4 million $\times$ 15.622 = USD 193.7 million Upper bound (100% factor): USD 17.75 million $\times$ 15.622 = USD 277.3 million Lower bound (50% factor): USD 8.9 million $\times$ 15.622 = USD 139.0 million

¶15 **Step 4: Calculate net present value of costs.** Capital costs of USD 15 million occur in years 0–2, with USD 5 million payable at the beginning of each year: year 0, year 1, year 2. Annual management costs of USD 3 million continue for 25 years.

¶16

$$\text{NPV of capital costs} = 5 \times \left(1 + \frac{1}{1.04} + \frac{1}{1.04^2}\right) = 5 \times 2.886 = 14.43 \text{ million}$$

¶17 *Note: this formula assumes beginning-of-year payments. Compilers replicating this calculation with end-of-year payment conventions should use the factor $(1/1.04 + 1/1.04^2 + 1/1.04^3) = 2.775$, yielding USD 13.88 million.*

¶18

$$\text{NPV of management costs} = 3 \times 15.622 = 46.87 \text{ million}$$

¶19

$$\text{Total NPV of costs} = 14.43 + 46.87 = 61.3 \text{ million}$$

¶20 **Step 5: Calculate benefit-cost ratio and present budget case.**

¶21 Central estimate: USD 193.7 / USD 61.3 = 3.16 Upper bound (100% factor): USD 277.3 / USD 61.3 = 4.52 Lower bound (50% factor): USD 139.0 / USD 61.3 = 2.27

¶22 *Note: The step-by-step figures above are authoritative. The budget submission narrative below rounds to one decimal place (3.16 $\rightarrow$ 3.2; 4.52 $\rightarrow$ 4.5; 2.27 $\rightarrow$ 2.3; USD 193.7M $\rightarrow$ USD 194M) for readability. Compilers replicating this example should carry unrounded figures through the calculation and apply rounding only in the final narrative.*

¶23 **Budget submission narrative:** “The Ministry of Environment requests USD 15 million capital expenditure over 2026–2028 and USD 3 million annually for ongoing management to expand marine protected area coverage from 15% to 30% of territorial waters. This expansion will approximately double the supply of coastal protection, carbon sequestration, fish nursery, and tourism services currently valued at USD 17.75 million annually from existing MPAs. Applying a marginal productivity discount of 70% (to account for the likelihood that expansion areas have lower average productivity than existing MPAs), the expected additional annual service flow is USD 12.4 million. Using a 4%

discount rate over 25 years, the central-estimate NPV of benefits is USD 194 million against costs of USD 61 million, yielding a benefit-cost ratio of 3.2 (range: 2.3 to 4.5 depending on marginal productivity assumption). This investment aligns with global Target 3 of the Kunming-Montreal Global Biodiversity Framework and will contribute to national commitments under the UN Convention on Biological Diversity. Physical accounts indicate that existing MPAs cover 45,000 hectares, and ecosystem extent accounts will track the addition of 45,000 hectares of protected area under the expansion programme, with condition monitoring to verify that service supply targets are achieved.”

Three decision use cases

¶1 Beyond MPA expansion, budget officials regularly face three additional decision use cases where ocean accounts provide the supporting evidence:

¶2 **Use case 1: Fisheries management budget justification.** A national fisheries agency seeks increased budget allocation for stock assessment and enforcement activities. Using the net GVA figure and depletion calculation derived in Section 3.4, a budget submission can state: “Fish stocks declined 9.5% in 2025 due to catch exceeding sustainable yield. At current depletion rates, the sector’s economic contribution will decline 25% over the MTEF period. Increased management expenditure of USD 2.5 million annually will stabilise stocks through enhanced monitoring and enforcement, protecting the sector’s contribution to GDP and employment.”

¶3 **Use case 2: Coastal protection infrastructure investment.** A ministry of public works evaluates whether to invest in seawall construction or mangrove restoration for coastal protection. Using Ocean Accounts data:

- ¶4 Ecosystem extent account records 500 km² of mangroves providing coastal protection services (TG-3.1)
- ¶5 Ecosystem service valuation estimates mangroves provide protection equivalent to USD 12,000 per hectare per year
- ¶6 Engineering cost estimate for equivalent seawall is USD 25 million per 10 km of coastline
- ¶7 Mangrove restoration cost estimate is USD 8,000 per hectare

¶8 Budget submission: “Ecosystem accounts indicate that existing mangroves provide coastal protection services worth USD 600 million annually (50,000 hectares × USD 12,000/ha/year). For context, the NPV of this annual flow at 4% over 25 years is approximately USD 9.4 billion. Restoring 250 hectares of degraded mangrove at USD 8,000/ha (total USD 2 million) can provide coastal protection comparable to approximately 2.5 km of seawall costing USD 6.25 million, depending on local conditions such as wave exposure and ecosystem health, whilst also supplying carbon sequestration and fish nursery services not provided by grey infrastructure.”

¶9 **Use case 3: Medium-term revenue forecasting for resource extraction.** A ministry of finance prepares MTEF revenue projections dependent on offshore oil extraction royalties. Using Ocean Accounts data:

- ¶10 Mineral asset account records proved reserves of 100 million barrels with 15-year extraction profile
- ¶11 Gross revenue from extraction is projected at USD 6 billion over MTEF period
- ¶12 Monetary depletion is USD 4.8 billion (equal to 80% of gross revenue; this part of the resource rent is a drawdown of the asset, not income)
- ¶13 Net revenue contribution to government (royalties and taxes) is USD 600 million over MTEF period

¶14 Budget submission: “Offshore extraction generates substantial gross revenue but also depletes the national mineral asset base. Asset accounts indicate that depletion equals 80% of gross extraction revenue, and that share is a drawdown of the asset rather than income. MTEF revenue projections should account for the finite nature of reserves and declining production profile.

Diversification investments funded from current resource revenues are needed to maintain fiscal capacity beyond the 15-year extraction horizon.”

3.6 Integration with MTEF and annual budgets

¶1 Ocean Accounts support MTEF development because the accounts structure supports temporal comparison and trend analysis. Asset accounts record opening and closing stocks, enabling projection of future asset values under different management scenarios. Supply and use tables for ecosystem services provide baseline data for estimating the future flow of benefits from marine ecosystems.

¶2 To integrate Ocean Accounts with MTEF processes, budget officials should:

¶3 **Establish baseline accounts:** Compile or obtain baseline ocean economy thematic accounts and relevant asset accounts for the most recent period for which complete data are available. These baselines serve as the reference point for projecting future contributions and assessing trends.

¶4 **Project asset and income trajectories:** Using the asset account structure, project forward the expected stocks of key marine assets (fish stocks, mangrove extent, coral reef condition) under current management policies. Combine this with projections of ocean economy GDP contribution to estimate the medium-term fiscal significance of the ocean sector. The worked example in Section 3.5 illustrates this projection approach for marine protected areas.

¶5 **Identify decision points:** Use the accounts to identify decision points where changes in management expenditure or policy could affect asset trajectories. For example, where fish stock accounts record declining trends that will cross a sustainability threshold within the MTEF period, the accounts provide a rationale for increased management investment. The threshold can be defined as the stock biomass at maximum sustainable yield (BMSY) from stock assessment models (TG-6.7).

¶6 **Align reporting periods:** Ensure that ocean accounting compilation cycles align with MTEF and annual budget preparation timelines. Ideally, accounts are updated at least annually and available to budget officials during the formulation phase of the budget cycle. For annual budget integration, the key requirement is timely availability of accounting data. Many countries compile national accounts with a lag of one to two years, and environmental accounts may have additional delays. Countries seeking to use Ocean Accounts in budget processes should prioritise timeliness in their compilation programmes, and may use provisional or ‘flash’ estimates for recent periods to inform current budget decisions. Provisional estimates carry the P (provisional) quality flag set out in **TG-0.7 Quality Assurance Principles** Section 3.6. Budget submissions using provisional ocean account data should indicate clearly that the figures are subject to revision.

3.7 Government expenditure on ocean-related functions

¶1 Ocean-related government expenditure is compiled by function using COFOG. The concordance – which COFOG classes carry ocean functions, how mixed classes are apportioned, and how the ocean share is documented – is set out in **TG-3.7 Governance Accounts** Section 3.3.5, Table 3.7.7.^{21, 22} Environmental protection and resource management expenditure is classified in parallel using CEPA and CReMA, per SEEA CF Chapter IV, and presented alongside other government activity in **TG-3.8 Combined Presentations**.

¶2 For budget purposes the compiled figure does three things.

¶3 **It establishes the current baseline.** A request for additional resource cannot be assessed without knowing what is already spent on the function, across all the agencies that spend on it. Because ocean functions are dispersed – enforcement in one ministry, habitat management in another, port infrastructure in a third – the COFOG-based total is frequently the first consolidated figure a finance ministry has seen, and is often larger than any single agency’s own account of the sector.

¶4 **It supports a return comparison.** Set against the ecosystem service values from **TG-3.2** or the sector GVA from TG-2.5, the expenditure figure allows a submission to state what public spending is protecting: “expenditure on marine protected area management totalled USD 8.2 million in 2025, over 72,000 hectares supplying USD 23 million annually in coastal protection, carbon sequestration and nursery habitat services”, or “management expenditure of USD 5.5 million supports a fishing sector contributing USD 175 million GVA and employing 32,000 persons”.

¶5 **It exposes the ocean share as the contested assumption.** Because most COFOG classes are mixed, the headline total depends on apportionment judgements that are rarely visible in the presented figure. A submission that states the ocean shares applied, and the basis for each, is far harder to dispute than one that presents a total alone – and a scrutiny process that goes looking for the assumption and does not find it will usually discount the whole figure.

¶6 One caution applies when expenditure and revenue are presented together. Governance expenditure (TG-3.7 Tables A to C) and governance revenue (Table D) come from different SEEA CF modules – outlay accounts classified by purpose, and environmental transactions classified by the nature of the transaction. They are not two halves of a single balance, and presenting a net position across them without reconciliation misstates both.

3.8 Ocean ecosystem assets in fiscal frameworks

¶1 Ocean ecosystem assets form a substantial component of sovereign natural capital, and one relevant to fiscal policy, sovereign debt management, and public finance decisions. This section provides guidance on incorporating ocean ecosystem asset values into fiscal frameworks, building on the monetary asset valuation methods described in this Circular and in **TG-1.9 Safe Usage of Monetary Valuation**.

¶2 **Sovereign natural capital.** The 2025 SNA recognises that natural capital, including both environmental assets and ecosystem assets, forms part of a country’s wealth. For countries with large ocean territories, marine ecosystem assets may constitute a substantial share of national wealth. Monetary ecosystem asset accounts, compiled using net present value methods applied to expected ecosystem service flows, provide estimates of ocean natural capital that can be incorporated into sovereign balance sheets. These estimates inform fiscal policy by revealing the extent to which current economic activity depends on the drawdown of natural capital stocks and whether that drawdown is sustainable.

¶3 **Blue bonds and sovereign borrowing.** Sovereign blue bonds are debt instruments whose proceeds are earmarked for ocean-related expenditures that maintain or enhance marine ecosystem assets. Ocean Accounts provide the evidence base for blue bond issuance in several ways:

- ¶4 Monetary ecosystem asset accounts demonstrate the value of the natural capital that blue bond proceeds will protect or restore
- ¶5 Ecosystem service flow accounts quantify the annual economic benefits that depend on maintaining ocean ecosystem condition
- ¶6 Time-series accounts provide the monitoring data needed for blue bond impact reporting
- ¶7 Depletion accounts reveal the fiscal cost of ecosystem degradation, which strengthens the case for preventive investment

¶8 Countries considering blue bond issuance should compile ocean ecosystem asset accounts as part of their bond preparation. That practice grounds the use-of-proceeds framework in standardised natural capital data. For blue bond structuring and other project-level instruments, see **TG-1.8 OA and Project-Level Finance**; for the multilateral project cycle, **TG-1.7**.

¶9 **Natural capital in fiscal risk assessment.** Fiscal risk assessments recognise that degradation of natural capital can affect government revenues (through reduced economic activity in nature-dependent sectors), increase government expenditures (through disaster response and adaptation costs), and create contingent liabilities (through environmental remediation obligations). Ocean

Accounts quantify these fiscal risks by tracking changes in ecosystem asset values over time and linking those changes to economic sector performance through supply and use tables.

4. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

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DRAFT

OA and Marine Spatial Planning

Provides guidance on using Ocean Accounts to inform marine spatial planning (MSP), including spatial data requirements, ecosystem service mapping.

Version 0.9.1 **Status** Draft **Stability** Applied

Last updated September 2026 **Responsible officer** Dr Jordan Gacutan

Drafting AI-assisted drafting from GOAP Secretariat source materials; source list to be published at the close of consultation.

OUTCOME

This Circular sets out how a marine spatial planning process uses Ocean Accounts: which account each stage of the planning cycle draws on, what a planner reads out of it, and how the results are presented for deliberation. Compilation of the accounts themselves is treated in Sections 2 to 4, to which this Circular refers rather than restating. Specific applications include (1) delineating spatial zones based on ecosystem service supply and demand patterns, (2) resolving conflicts between competing ocean uses – fisheries, aquaculture, shipping, offshore energy, tourism – by quantifying overlapping spatial footprints and ecosystem dependencies, (3) prioritising areas for protection or restoration based on ecosystem condition and service flow accounts, and (4) evaluating proposed spatial allocations through scenario analysis that projects changes in ecosystem extent, condition, economic outputs and service flows. Section 3.5 gives an eight-step application procedure from defining the planning area to monitoring an adopted plan, and Section 3.4.2 sets out what the accounts can and cannot settle: the framework quantifies the ecological cost of a spatial allocation alongside its economic benefit, but the choice between allocations remains a political decision, and intrinsic, relational and customary values are not captured by an exchange-value account.

CONTENTS

1. Outcome	3
2. Requirements	3
3. Guidance Material	3
3.1 What is marine spatial planning?	3
3.2 Information needs for MSP	4
3.3 Ocean accounts data for spatial planning	5
3.4 Integrating accounts into MSP processes	8
3.5 Application procedure for MSP practitioners	10
3.6 Case examples	15
4. Acknowledgements	16
5. References	16

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DRAFT

1. Outcome

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2. Requirements

- ¶1 **TG-0.1 General Introduction to Ocean Accounts** – provides foundational understanding of the Ocean Accounts Framework, including the spatial data framework and ecosystem asset concepts essential for marine spatial planning applications.
- ¶2 **TG-3.1 Asset Accounts** – provides methods for compiling ecosystem extent and condition accounts, including the Ecosystem Condition Typology (ECT) framework, reference condition establishment, and composite condition index construction used throughout this Circular.
- ¶3 **TG-3.3 Economic Activity Relevant to the Ocean** – provides methods for spatially allocating economic activity data to Basic Spatial Units, required for spatial conflict identification in Step 3. Practitioners should compile TG-3.3 accounts before undertaking spatial conflict analysis; where TG-3.3 accounts are not yet available, Step 3 may proceed using proxy activity data with appropriate caveats.
- ¶4 **TG-4.1 Remote Sensing and Geospatial Data** – provides remote sensing resolution thresholds and spatial data methods for BSU delineation and ecosystem extent mapping used in Sections 3.3.1 and 3.3.2.

¶5 Readers approaching Section 1 for the first time should begin with **TG-1.0 Ocean Accounting and the Blue/Ocean Economy**, the framing circular for the section, which sets out the ocean economy terminology used throughout, what an ocean account can and cannot certify about a blue economy claim, and the map from a policy question to the circular that answers it. It is recommended reading, not a prerequisite.

3. Guidance Material

3.1 What is marine spatial planning?

¶1 **Marine Spatial Planning (MSP)** is a public process of analysing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that are usually specified through a political process¹. MSP emerged in the early 2000s as ocean space came under proactive, integrated, and spatially explicit governance, in place

of the earlier reactive, sector-by-sector approach. The move to integrated governance responded to growing conflicts between ocean uses and to the recognition that cumulative impacts require integrated responses. MSP serves as an ‘implementation mechanism’ through which high-level policy commitments (such as the Sustainable Development Goals and Convention on Biological Diversity targets) are translated into spatial management action within national marine jurisdictions².

¶2 MSP is at root a spatial process. It requires decisions about where different activities may occur, where they should be excluded, and how multiple uses can be accommodated within the same marine area. These decisions must account for the distribution of marine ecosystems, the spatial footprint of human activities, and the connections between adjacent areas, both marine and terrestrial. The United Nations Educational, Scientific and Cultural Organization (UNESCO) has promoted MSP globally, and the Intergovernmental Oceanographic Commission provides technical guidance on planning approaches³.

¶3 For UNCLOS maritime zone definitions (territorial sea, EEZ, continental shelf, ABNJ), see **TG-0.6 Glossary** (Exclusive Economic Zone entry). These zones define the geographic scope within which national MSP processes operate. UNCLOS Articles 56 and 61-62 grant coastal states sovereign rights over natural resources and responsibility for conservation and management of living resources within their exclusive economic zone⁴.

¶4 The UN-GGIM Working Group on Marine Geospatial Information has identified MSP as a key application area requiring integrated marine geospatial information management⁵. Effective MSP depends on the availability of consistent, interoperable spatial data that can be integrated across hydrographic, oceanographic, biological, and socioeconomic domains to support evidence-based planning decisions.

3.2 Information needs for MSP

¶1 Marine spatial planners require information across several domains to make informed decisions about the allocation of ocean space. The information needs of MSP can be organised into four broad categories: ecological, economic, social, and governance information.

¶2 **Ecological information** encompasses the distribution and condition of marine ecosystems, the habitats they provide, and the ecological processes that maintain ecosystem functioning. Planners need to know where different ecosystem types occur (coral reefs, seagrass meadows, mangroves, pelagic systems, benthic habitats), their current condition relative to reference states, and how they are connected through species movements, larval dispersal, and nutrient flows. The IUCN Global Ecosystem Typology provides a standardised classification of marine ecosystem functional groups that can support consistent spatial mapping across jurisdictions⁶.

¶3 **Economic information** includes the location and intensity of economic activities, their dependencies on marine ecosystem services, and their impacts on marine ecosystems. Key activities include fisheries (both commercial and artisanal), aquaculture, shipping and ports, offshore energy (oil, gas, wind, wave), mining, tourism and recreation, and coastal development.

¶4 **Social information** captures the distribution of benefits and costs across different community groups, including indigenous and traditional uses, subsistence activities, recreational values, and cultural connections to marine places. Equity considerations are recognised as central to legitimate MSP processes: who benefits and who bears costs from different spatial allocations.

¶5 **Governance information** documents existing management arrangements, protected area designations, customary tenure systems, and regulatory frameworks that constrain or enable spatial planning decisions. Documentation extends to jurisdictional boundaries, existing use rights, and the institutional arrangements through which planning decisions are made and implemented.

¶6 A central challenge for MSP is integrating these diverse information types within a coherent spatial framework. Data often come from different sources, use inconsistent spatial units, and lack

the temporal alignment needed for integrated analysis. Through their application of accounting principles and spatial frameworks, Ocean Accounts offer a structured approach to that integration.

¶7 Table 1 maps the typical phases of an MSP process to their core information needs and identifies which Ocean Account components can supply the required data. Planners can use this matrix to identify which accounts to prioritise for compilation given the current stage of their MSP process and to communicate data requirements to the statistical agencies responsible for account production⁷.

¶8 **Table 1: MSP planning phases, information needs, and Ocean Account sources**

MSP Phase	Information Need	Ocean Account Source
Baseline assessment	Ecosystem distribution and condition	Extent accounts, condition accounts
Zoning design	Activity-ecosystem overlap and conflicts	Economic accounts, extent accounts
Impact prediction	Service flow changes under scenarios	Service flow accounts, condition accounts
Trade-off analysis	Quantified costs and benefits of alternatives	Monetary accounts, service flow accounts
Monitoring and review	Condition and use changes over time	Time-series condition and extent accounts
Cross-border integration (trans-boundary planning)	Comparable spatial and ecological baselines across jurisdictions	Standardised BSU framework; harmonised extent and condition accounts
Stakeholder and knowledge integration	Open, common evidence base reducing information asymmetry across actors	All accounts (extent, condition, services, economic); standardised classifications

¶9 The first five rows of Table 1 map sequential MSP planning phases to their core information needs. The final two rows capture cross-cutting integration dimensions that operate across all phases. Cross-border integration is supported because a standardised BSU framework and harmonised accounting classifications enable comparable spatial and ecological baselines between neighbouring jurisdictions sharing marine areas². Publishing accounts under common classifications supports stakeholder and knowledge integration: information asymmetry between government, industry, indigenous and local knowledge holders, and the wider public is reduced, and deliberation proceeds from a shared evidence base. A fuller five-dimension integration framework (policy and sector, cross-border, stakeholder, knowledge, and temporal integration) is set out in Gacutan et al. (2022)², to which practitioners are referred for the conceptual underpinning of these rows.

3.3 Ocean accounts data for spatial planning

¶1 The Ocean Accounts Framework provides several components essential for MSP. The spatial data framework, ecosystem extent accounts, ecosystem condition accounts, ecosystem services accounts, and governance accounts each contribute essential information for spatial planning decisions.

3.3.1 The spatial data framework

¶1 The spatial foundation of Ocean Accounts is built on **Basic Spatial Units (BSUs)**, the smallest units at which information is compiled and from which aggregations can be made⁸. BSUs are defined to be exhaustive and mutually exclusive within the ecosystem accounting area (EAA), so that every location within the EAA is assigned to exactly one BSU. For marine applications, BSUs may be differentiated into coastal and marine units, with depth layers enabling three-dimensional representation of ocean systems.

¶2 Figure 1.2.2 sets out how the three spatial units relate. The ecosystem accounting area fixes the territory the account covers; ecosystem assets divide it into contiguous areas each assigned to a single ecosystem type; and the BSU grid tessellates it so that extent is obtained by summing cells of the same class.

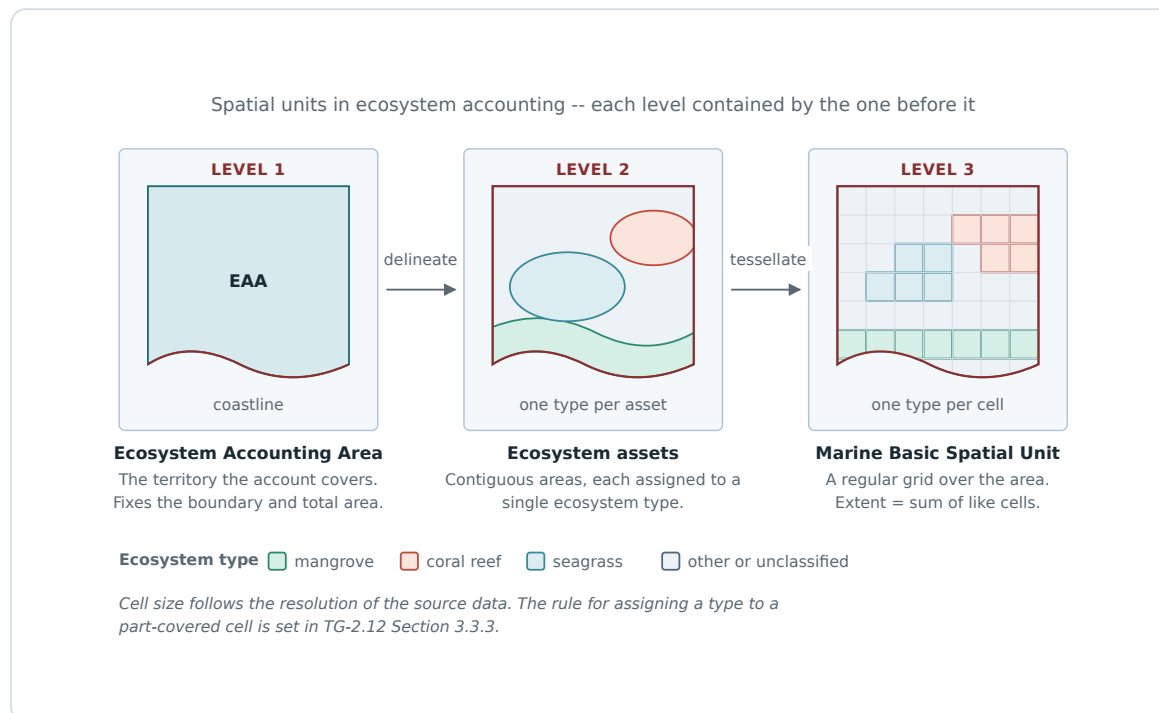


Figure 1.2.2 The accounting area fixes the territory; ecosystem assets divide it by type; the grid tessellates it so extent can be summed.

Source: Adapted from Rahayu et al. (2024), *Optimising Marine Basic Spatial Units (MBSU) for Ocean Accounting using empirical data from Saleh Bay, Indonesia*, One Ecosystem 9: e125578, Figure 1, licensed CC BY 4.0. Definitions follow SEEA EA 2024.

¶3 The resolution at which BSUs are compiled is set by **TG-2.12 Spatial Data Frameworks** Section 3.3, which is normative for minimum mapping units and BSU resolution, and constrained by the sensor and product thresholds in **TG-4.1 Remote Sensing and Geospatial Data**. An MSP process is not usually in a position to specify that resolution: it receives accounts already compiled at whatever resolution the national data infrastructure supports.⁹

¶4 The question for a planner is therefore an adequacy question, asked at Step 1 of the application procedure in Section 3.5:

- ¶5 Can the accounts distinguish the narrowest use zone the plan needs to allocate?
- ¶6 Can they distinguish the habitat patches whose loss or protection the plan turns on?
- ¶7 Where pelagic and benthic uses are allocated separately, do the accounts carry a depth stratum, or do they collapse both into one cell?

¶8 Where the answer is no, the plan should say so explicitly and either allocate at a coarser grain than the accounts support – documenting the limitation to stakeholders – or commission supplementary survey to the specification in TG-2.12 Section 3.3. Refining the grid mid-process is a compilation decision with consequences for the extent time series, and must be recorded as a methodological revision rather than treated as ecosystem change.

¶9 The delineation of marine BSUs presents specific challenges not encountered in terrestrial ecosystem accounting. Marine ecosystems are inherently three-dimensional, with distinct communities at different depth strata. Pelagic (water column) and benthic (seafloor) ecosystems may occupy the same horizontal location but represent distinct functional units. The BSU framework enables consistent spatial referencing across multiple data types: economic activities, ecosystem types, and

condition indicators can all be assigned to BSUs. Planners can then examine how different variables co-occur and interact within the same spatial framework.

3.3.2 Ecosystem extent accounts

¶1 **Ecosystem extent accounts** record the area of each ecosystem type within each BSU over time¹⁰. For marine applications, extent accounts capture the spatial distribution of ecosystem types such as coral reefs, seagrass meadows, mangroves, kelp forests, coastal wetlands, and various pelagic and benthic marine ecosystems. The accounts track changes in extent through additions (ecosystem restoration, natural expansion) and reductions (ecosystem conversion, degradation).

¶2 Extent accounts provide MSP with baseline information on where different ecosystem types occur and how their distribution is changing. The ecosystem classification used in extent accounts should align with internationally recognised typologies. The IUCN Global Ecosystem Typology provides a hierarchical classification with realm (marine), biome (e.g., marine shelf), and ecosystem functional group (e.g., tropical coral reefs) levels that can be adapted to national contexts¹¹. See **TG-3.1 Asset Accounts** Section 3.4.1 for detailed guidance on ecosystem extent account compilation methods.

Ecosystem extent by designated use

¶1 A particularly useful analytical output for MSP is the cross-tabulation of ecosystem extent by designated use category. This approach overlays ecosystem extent data with the spatial footprint of designated marine use zones to reveal how different ecosystem types are distributed across management and activity areas. The resulting matrix records, for each ecosystem type, how much of its extent falls within fishery zones, port areas, tourism zones, marine protected areas, and areas not currently designated for specific uses. This information is directly relevant to spatial planning because it makes explicit the relationship between ecological assets and human use allocations, a relationship that is often obscured when ecological and economic data are compiled separately.

¶2 Table 2 illustrates this approach using simplified example data from an ESCAP pilot exercise in the Pacific region¹². Values are recorded in hectares (ha), consistent with SEEA EA para 4.15, which requires ecosystem extent accounts to be compiled in area units.

¶3 **Table 2: Example cross-tabulation of ecosystem extent by designated use category (ESCAP pilot exercise, hectares)**

Ecosystem type	Fishery (ha)	Port (ha)	Tourism (ha)	Marine Protected Area (ha)	Not in designated use area (ha)	Total (ha)
Mangroves	650	220	870	870	220	2,830
Seagrasses	440	0	0	1,100	1,320	2,860
Coral reefs	350	0	175	1,225	1,050	2,800

¶4 Cross-tabulations are compiled in area units consistent with SEEA EA para 4.15. Where a first compilation has used BSU counts because individual BSU area is not yet standardised, **TG-3.1 Asset Accounts** Section 3.5.1 sets out the conversion to area units and how the resulting revision is recorded in the extent account.¹³

¶5 The cross-tabulation reveals patterns relevant to spatial planning. In this example, coral reefs are predominantly located within marine protected areas, which suggests existing protection measures are well targeted. Mangroves are more evenly distributed across use categories, including port and tourism zones, and are therefore more exposed to development pressures. Seagrass ecosystems have substantial extent outside any designated use area, which may represent either a gap in spatial planning coverage or areas where formal designation has not yet occurred. The table can be expanded to include additional ecosystem types and use categories, extended over multiple

accounting periods to reveal trends in spatial allocation, and supplemented with condition data to indicate how ecosystem quality varies across use zones.

3.3.3 Condition, services and governance accounts

¶1 The remaining account types are compiled elsewhere in the Technical Guidance. What matters for MSP is what a planner reads out of each and at which step of the planning process.

Account	What an MSP process reads out of it	Where it is compiled
Ecosystem condition ¹⁴	Which areas hold high ecological integrity and are protection priorities; which are degraded and are restoration candidates or better suited to lower-sensitivity uses; how condition is likely to respond to each scenario	Variables and reference conditions: TG-3.1 Section 3.5.2. Normalisation, aggregation and scenario projection: TG-2.1 Sections 3.4 and 3.6
Ecosystem services ¹⁵	Which areas generate which services, and where the benefits land – the service providing area and the service benefiting area are usually not the same place, and a spatial allocation can move one without moving the other	TG-3.2 Sections 3.1 and 3.3; indicator selection in TG-2.4
Governance	Jurisdictional and administrative boundaries, including overlapping authorities; existing use rights, designations and customary tenure; which institution regulates which use in which location; transboundary instruments where the planning area abuts another jurisdiction	TG-3.7 ; indicators in TG-2.13

¶2 Two points bear directly on spatial allocation.

¶3 **Service providing and service benefiting areas are spatially distinct.** A mangrove stand supplies coastal protection to the settlements behind it, not to itself. A decision to permit aquaculture in that stand reduces extent in one location and reduces protection in another, and only the supply-use articulation in TG-3.2 makes the second consequence visible. Allocations that look locally efficient can be regressive once the benefiting area is identified, and the distributional question – who loses the service – is a planning question rather than an accounting one.

¶4 **Governance accounts are an emerging account type.** Compilation methodology is still developing, and a full governance account is not a precondition for MSP. Practitioners should compile at minimum a spatial layer of policy and management designations that can be cross-tabulated against ecosystem extent, as in Table 2. That single cross-tabulation makes the policy-ecology relationship explicit, and it is what carries most of the analytical weight in transboundary settings under UNCLOS and in jurisdictions where customary or indigenous tenure coexists with statutory regimes.

3.4 Integrating accounts into MSP processes

¶1 The integration of Ocean Accounts into MSP processes can occur at multiple stages of the planning cycle: situation assessment, goal setting, spatial analysis, plan development, implementation, and monitoring. MSP aligns strategic targets across policies and manages human activities in ocean space, whilst OA provides a structured, standardised evidence base that informs each stage of that process².

3.4.1 Situation assessment

¶1 In the initial assessment phase, MSP processes characterise the current state of the marine area: its ecosystems, uses, and governance arrangements. Ocean accounts provide a structured compilation of this information within a consistent spatial framework. Ecosystem extent accounts record what ecosystems are present and where, and condition accounts indicate their integrity. Economic

accounts document current activities and their spatial footprint, whilst services accounts demonstrate how ecosystems contribute to human wellbeing.

3.4.2 Trade-off analysis

¶1 A central function of MSP is to weigh trade-offs between competing objectives: economic development versus environmental protection, one sector versus another, and current uses versus future options. The SEEA AFF notes that “data that are in a common framework can be used to assess trade-offs between alternative scenarios using various modelling techniques”¹⁶. In the MSP context, planners can examine how different spatial allocations would affect ecosystem extent, condition, and services, as well as economic outputs and social benefits. The accounting framework does not resolve trade-offs, which remain political decisions. It provides a transparent evidence base for deliberation.

¶2 To illustrate, consider a simplified trade-off between designating a coastal area as an aquaculture zone versus maintaining it as an undesignated mangrove ecosystem. Using accounts data, planners can compare the economic output from aquaculture production (recorded in economic accounts) against the value of ecosystem services that the mangrove currently provides: coastal storm protection (estimated via avoided damage costs), carbon sequestration (estimated via social cost of carbon), and nursery habitat supporting adjacent fisheries (estimated via the contribution of mangrove-dependent species to commercial catch). See **TG-1.9 Safe Usage of Monetary Valuation** for the valuation level at which avoided damage cost estimates sit and their appropriate use in ocean accounting contexts. Both methods are illustrative approximations pending country-specific calibration¹⁷. Even where the mangrove’s annual service flows exceed the projected net returns from aquaculture, the allocation decision involves distributional effects, employment, food security, and other policy considerations. The accounts ensure that ecological costs of conversion are quantified alongside economic benefits, so that deliberation is informed without an outcome being prescribed.

¶3 OA trade-off analysis captures quantitative and instrumental values: physical measurements (hectares, tonnes, people protected) and monetary exchange values. It may not fully represent intrinsic, relational, or non-material values, including the cultural, spiritual, and traditional use connections to marine places held by indigenous communities, coastal peoples, and other stakeholders. Where such values are relevant to the planning decision, OA trade-off analyses should be complemented by participatory valuation or deliberative assessment methods². The accounting structure also allows planners to examine partial conversion scenarios, where a portion of the mangrove is converted whilst the remainder is protected, and to assess how service flows change at different conversion thresholds.

3.4.3 Scenario development and evaluation

¶1 MSP typically involves developing and evaluating alternative spatial scenarios before selecting a preferred plan. For each scenario, planners can project:

- ¶2 Changes in ecosystem extent (what areas would be converted or protected)
- ¶3 Changes in ecosystem condition (how would ecosystem integrity be affected)
- ¶4 Changes in ecosystem services (how would service flows be altered)
- ¶5 Changes in economic outputs (how would production and employment be affected)
- ¶6 Distribution of benefits and costs (who would gain and who would lose)

¶7 The accounting framework ensures that these projections are internally consistent, so that projected changes in ecosystem extent are reflected in projected changes in services. The use of OA to support scenario and trade-off analysis in MSP is a core integration use case identified in the peer-reviewed MSP-OA literature². Scenario projections should where possible be accompanied by uncertainty ranges for condition and service flow indicators. See **TG-0.7 Quality Assurance**

Principles Section 3.4 for the four categories of uncertainty that apply to ocean accounts, including uncertainty in ecosystem dynamics and in future prices and values.

3.4.4 Monitoring and evaluation

¶1 After plan adoption, ongoing monitoring is essential to assess whether the plan is achieving its objectives. Extent accounts indicate whether ecosystems are being maintained or lost, condition accounts indicate whether ecosystem integrity is improving or declining, and services accounts reveal whether ecosystem contributions to wellbeing are being sustained. The temporal dimension of accounts, which record stocks and flows at regular intervals, aligns naturally with monitoring requirements. Annual or periodic account compilation creates time series that reveal trends and enable adaptive management responses.

3.5 Application procedure for MSP practitioners

¶1 The following procedure guides MSP practitioners in incorporating ocean accounts data into spatial planning decision-making. It assumes that extent, condition, and service flow accounts have been compiled (or are in the process of compilation) by the national statistical office or designated ocean accounting agency. Figure 1.2.1 illustrates the eight steps grouped into Scoping, Analysis, and Decision & Monitoring phases. It shows which ocean account types feed each step and how monitoring closes the adaptive-management cycle.

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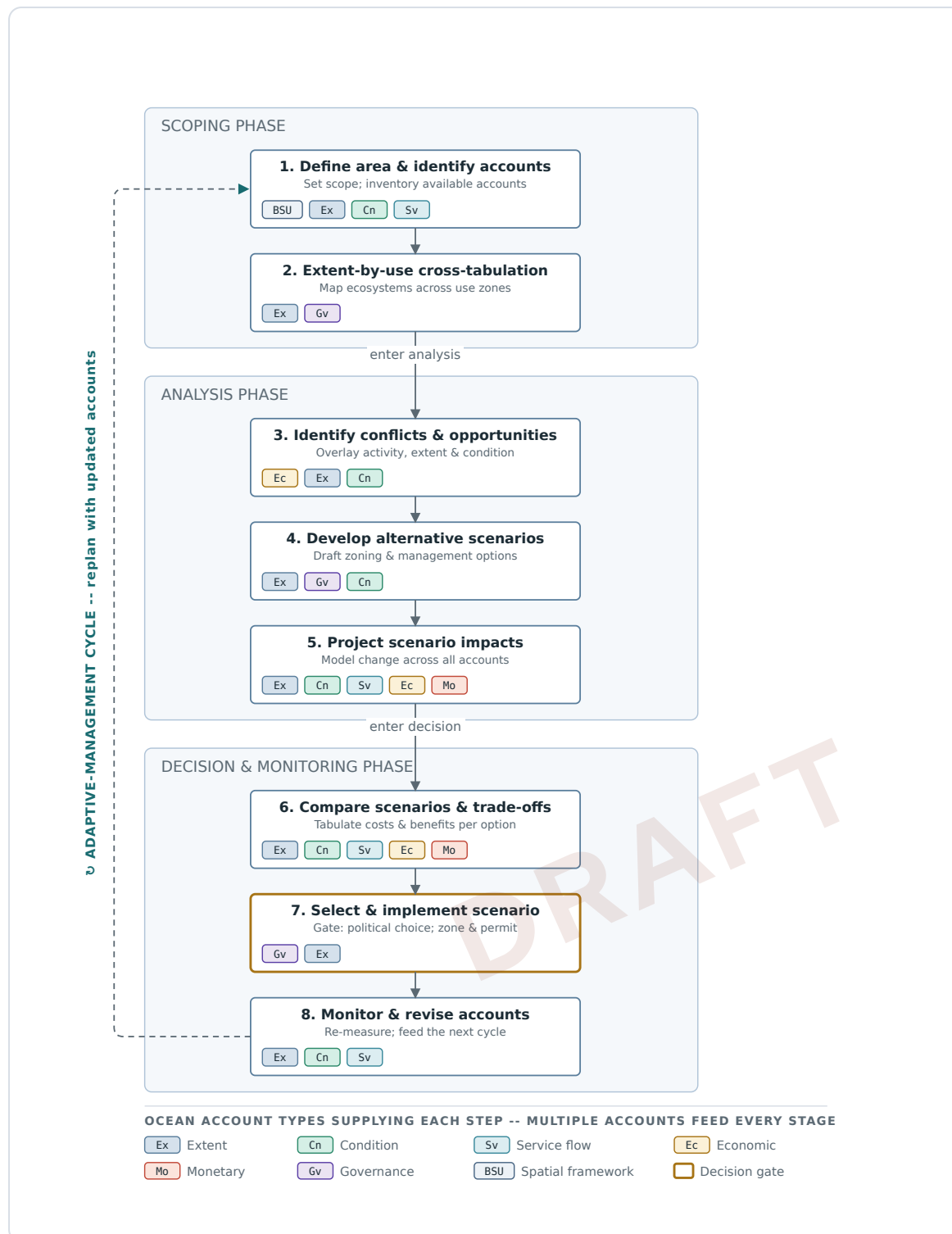


Figure 1.2.1 Eight MSP steps in Scoping, Analysis, and Decision & Monitoring phases draw on multiple ocean account types at every stage. [a] Colour chips = account types supplying each step. [b] Dashed return = adaptive-management cycle from monitoring to scoping.

Source: TG-1.2 §3.5 (eight-step application procedure), Table 1 (§3.2, MSP phases and Ocean Account sources), and §3.4 (integrating accounts across the planning cycle).

Adapted from: IOC/UNESCO MSP step-by-step guide (Ehler & Douvère 2009), which frames MSP as a continuous, adaptive cycle; EU Maritime Spatial Planning Directive 2014/89/EU, Annex I.

Step 1: Define the planning area and identify available accounts

¶1 Establish the geographic scope of the MSP process and identify which ocean accounts are available for that area. The planning area should align with jurisdictional boundaries (e.g., state

or provincial waters, exclusive economic zone) and should be defined using the same coordinate reference system as the accounts. Contact the national statistical office or ocean accounting coordinator to determine:

- ¶2 Which ecosystem types have been mapped within the planning area (extent accounts)
- ¶3 What condition indicators have been compiled and at what spatial resolution (condition accounts)
- ¶4 Which ecosystem services have been quantified, in physical or monetary terms (service flow accounts)
- ¶5 What time periods are covered (annual accounts, multi-year series)
- ¶6 What spatial resolution (BSU size and geometry) is used in the accounts

¶7 Where accounts cover only part of the planning area (for example, where extent accounts exist for coastal waters but not the full EEZ, or where condition accounts are available for coral reefs but not pelagic ecosystems), practitioners should document coverage gaps and use proxy or interim data for unaccounted areas where available. Data limitations should be communicated transparently to planning stakeholders. See SEEA EA Chapter 14 for guidance on graduated account implementation and methods for progressing from partial to full coverage. If accounts are not yet available for the planning area, this step should identify priority accounts to compile based on the MSP information needs identified in Table 1.

Step 2: Compile extent-by-use cross-tabulation

¶1 Using the ecosystem extent accounts and a spatial layer of current or proposed use designations (fishery zones, aquaculture zones, shipping lanes, protected areas, etc.), compile a cross-tabulation table similar to Table 2. Record values in hectares consistent with SEEA EA para 4.15. This reveals the current spatial distribution of ecosystems across use categories and identifies:

- ¶2 Ecosystem types with high exposure to extractive or development activities
- ¶3 Ecosystem types with low representation in protected areas
- ¶4 Areas where multiple uses overlap with high-value ecosystems
- ¶5 Gaps where ecosystems are not currently subject to any designated use

¶6 This matrix forms the baseline for evaluating alternative spatial allocations.

Step 3: Identify spatial conflicts and opportunities

¶1 Overlay economic activity data from ocean accounts (fishing effort, aquaculture production, shipping traffic, tourism visitation) with ecosystem extent and condition data to identify spatial conflicts (locations where human activities and sensitive ecosystems co-occur) and spatial opportunities (locations where condition is high and activities are low, making them candidates for protection, or where condition is degraded and restoration efforts could yield co-benefits). For guidance on mapping economic activities to spatial units, see **TG-3.3 Economic Activity Relevant to the Ocean**, which provides methods for allocating supply-use table outputs to Basic Spatial Units. Note that this step depends on availability of TG-3.3 accounts. Where these are not yet compiled, spatial conflict identification may proceed using proxy activity data (e.g., vessel monitoring records, permit data, site survey estimates) with appropriate documentation of data limitations.

¶2 Spatial conflicts may include:

- ¶3 Fishing effort concentrated in areas with declining fish stocks (condition accounts show degradation)
- ¶4 Aquaculture zones overlapping with mangrove or seagrass extent (extent accounts show habitat loss)
- ¶5 Shipping lanes crossing marine protected areas or whale migration corridors (seascape connectivity variables from condition accounts)

- ¶6 Offshore energy development in high-biodiversity areas (compositional state variables from condition accounts)

Step 4: Develop alternative spatial scenarios

¶1 Based on the conflict and opportunity analysis, develop two or more alternative spatial scenarios that differ in how ocean space is allocated. Each scenario should specify:

- ¶2 Spatial boundaries of use zones (aquaculture, fishing, shipping, energy, tourism, protection)
- ¶3 Management intensity within each zone (e.g., no-take protected area versus multi-use management)
- ¶4 Areas designated for restoration or conservation priority

¶5 Scenarios should be designed to address identified conflicts while advancing planning objectives (e.g., protecting 30% of marine area, maintaining fisheries yield, supporting coastal livelihoods)¹⁸.

Step 5: Project scenario impacts using accounts

¶1 For each scenario, use the accounts to project changes in key variables. This requires translating spatial allocations into quantitative changes:

- ¶2
Extent changes: If a scenario converts mangrove to aquaculture, estimate the hectares of mangrove extent lost and the corresponding increase in aquaculture area. Record these as reductions (conversions from mangrove) and additions (conversions to aquaculture).
- ¶3
Condition changes: If a scenario establishes a no-take marine protected area, estimate the expected improvement in condition over time based on ecological recovery rates from the literature or from condition time series in similar protected areas. If a scenario permits increased fishing effort, estimate the expected decline in condition based on pressure–condition relationships. Note that ocean accounts do not record the immediate impact of a management action on ecosystem condition: the efficacy of a management decision is traceable over successive accounting periods as condition variables in the ECT are updated. For example, MPA establishment reduces fishing pressure on compositional state variables (e.g., fish community diversity, coral cover); improvement in the composite condition index may take 3–5 years or more to be observable in the accounts depending on ecosystem recovery rates. The six-step procedure for projecting a condition trajectory under a management scenario is set out in **TG-2.1** Section 3.6.2; see **TG-3.1 Asset Accounts** Section 3.5.2 for ECT variable selection.
- ¶4
Service flow changes: If mangrove extent declines, estimate the change in coastal protection services (beneficiaries at risk), carbon sequestration (tonnes CO₂), and nursery habitat (change in juvenile fish recruitment). Use the supply–use framework from ecosystem services accounts to allocate changes in service supply to benefiting areas and sectors. **TG-3.2 Flows from Environment to Economy** Section 3.3 gives the supply–use table structure, the compilation method, and a worked example of which table entries change under a spatial conversion scenario.
- ¶5
Economic output changes: Use economic accounts to estimate changes in production and employment from different spatial allocations. For example, if aquaculture zones expand, project increased aquaculture output; if fishing zones contract, project reduced catch (or, if condition improves, potentially increased sustainable yield over the medium term).

¶6 These projections need not be precise (MSP is inherently a forward-looking exercise with uncertainty), but they should be consistent within the accounting framework, so that changes in one account are reflected in related accounts.

Step 6: Compare scenarios and present trade-offs

¶1 Present the projected impacts of each scenario in a summary table or dashboard that enables comparison across scenarios. Table 3 provides an illustrative template.

¶2 **Table 3: Illustrative scenario comparison for MSP using ocean accounts data**

Indicator	Baseline (Current)	Scenario A: Conservation Priority	Scenario B: Development Priority	Scenario C: Balanced Allocation
Extent (hectares)				
– Mangrove	12,500	13,000 (+4%)	10,000 (-20%)	11,800 (-6%)
– Seagrass	8,000	8,500 (+6%)	7,200 (-10%)	7,800 (-3%)
– Coral reef	3,500	3,500 (0%)	3,200 (-9%)	3,400 (-3%)
Condition (index 0-1) ¹⁹				
– Coastal ecosystems	0.62	0.72 (+16%)	0.54 (-13%)	0.65 (+5%)
Services (annual)				
– Coastal protection (people protected)	45,000	50,000 (+11%)	38,000 (-16%)	44,000 (-2%)
– Carbon sequestration (tonnes CO ₂)	25,000	28,000 (+12%)	20,000 (-20%)	24,000 (-4%)
– Fish provisioning (tonnes)	12,000	13,500 (+13%)	11,000 (-8%)	12,800 (+7%)
Economic output (million USD)				
– Fisheries	45	48 (+7%)	42 (-7%)	47 (+4%)
– Aquaculture	20	18 (-10%)	32 (+60%)	24 (+20%)
– Tourism	30	35 (+17%)	28 (-7%)	32 (+7%)
Protected area coverage (%)	15%	32%	12%	22%

¶3 This comparison reveals trade-offs across scenarios. Scenario A (Conservation Priority) achieves high protection coverage and improved ecosystem condition ²⁰. It supports long-term service flows and tourism but constrains aquaculture expansion. Scenario B (Development Priority) maximises aquaculture output but results in ecosystem extent loss, condition decline, and reduced service flows, with potential long-term costs to coastal protection and fisheries sustainability. Scenario C (Balanced Allocation) seeks a middle path, with moderate protection expansion, modest ecosystem improvements, and accommodation of some aquaculture growth. The choice among scenarios remains a policy decision informed by national priorities, stakeholder input, and international commitments.

Step 7: Select and implement a preferred scenario

¶1 Following stakeholder consultation and political decision-making, select a preferred scenario and translate it into spatial management regulations: zoning maps, use permits, protection designations, and monitoring requirements. The accounts compiled during the planning process establish the baseline against which future monitoring will measure progress.

Step 8: Monitor and revise using updated accounts

¶1 After plan implementation, continue compiling extent, condition, and service flow accounts at regular intervals (annually or biennially). Use the time-series data to assess whether the spatial plan is achieving its intended outcomes:

- ¶2 Are protected ecosystems maintaining or improving condition?
- ¶3 Are use zones delivering expected economic outputs without exceeding sustainable limits?

- ¶4 Are service flows to beneficiaries being sustained or enhanced?

¶5 Where monitoring reveals deviations from expected trajectories, apply adaptive management (adjusting use intensity, expanding or contracting zones, or implementing restoration interventions), informed by updated accounts data. See **TG-1.3 Marine Spatial Management (including MPAs)** for detailed guidance on using accounts for MPA effectiveness monitoring and adaptive management.

3.6 Case examples

3.6.1 Ecosystem extent mapping for spatial zoning

¶1 Several countries have applied ecosystem extent mapping approaches consistent with SEEA EA principles to support marine spatial planning. Australia's National Marine Ecosystem Classification provides a hierarchical classification of marine ecosystems that can be mapped at national scales and used to ensure that MSP processes consider the full range of ecosystem types within their jurisdiction²¹. Similarly, the European Union's MAES (Mapping and Assessment of Ecosystems and their Services) initiative has developed marine ecosystem maps that inform spatial planning under the EU Maritime Spatial Planning Directive²².

¶2 By establishing consistent ecosystem classifications and spatial representations, these mapping efforts enable planners to identify where particular ecosystem types occur, assess their representation within existing protected areas, and target spatial allocations to achieve conservation objectives.

3.6.2 Ecosystem services valuation for spatial allocation

¶1 The valuation component of Ocean Accounts, whilst acknowledged to have methodological challenges, can inform MSP decisions by making explicit the economic values at stake in different spatial allocations. Coral reef ecosystems, for example, provide coastal protection services whose value can be estimated using avoided damage cost methods, and tourism services whose value can be estimated from visitor expenditure data²³.

¶2 When these values are mapped spatially, planners can identify high-value service areas and assess how different development scenarios would affect aggregate service values. Such analyses should not be the sole basis for planning decisions, but they provide useful information for deliberation, particularly in contexts where ecosystem service values might otherwise be overlooked.

3.6.3 Marine Protected Area planning

¶1 Marine Protected Areas (MPAs) represent a specific application of spatial planning where Ocean Accounts data are directly relevant. MPA network design requires information on:

- ¶2 Ecosystem representation (are all ecosystem types included?)
- ¶3 Ecosystem condition (are areas of high integrity prioritised?)
- ¶4 Connectivity (are areas connected to allow species movement?)
- ¶5 Threat exposure (are areas exposed to pressures that protection can address?)

¶6 Extent and condition accounts provide systematic data for addressing these questions. Several Pacific Island countries have used ecosystem accounting approaches to inform MPA network design, integrating ecological data with socioeconomic information on fishing effort and community dependence to identify areas where protection can achieve conservation benefits while minimising social costs²⁴.

¶7 For detailed guidance on using accounts to monitor MPA effectiveness and track ecosystem recovery, see **TG-1.3 Marine Spatial Management (including MPAs)**.

3.6.4 Resolving spatial conflicts between offshore energy and fisheries

¶1 Offshore renewable energy development creates spatial conflicts with existing ocean uses, particularly fisheries and shipping. In the North Sea, multiple countries have applied spatial analysis combining fisheries effort data (from vessel monitoring systems), wind farm footprints, and ecosystem condition indicators to identify areas where wind energy development would minimise displacement of fishing activity while avoiding high-biodiversity habitats²⁵. Whilst not always framed explicitly as ocean accounts, these analyses apply accounting principles (spatially explicit activity data, ecosystem condition baselines, and trade-off assessment) to inform spatial allocation decisions. As offshore wind capacity expands globally, integrating fisheries accounts, energy accounts, and ecosystem condition accounts within a common spatial framework will become important for resolving use conflicts. For detailed guidance on accounting for offshore energy activities and their spatial interactions with marine ecosystems, see **TG-6.9 Offshore Energy Thematic Methods**.

4. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

5. References

1. ¶1 Ehler, C. & Douvère, F. (2009). *Marine Spatial Planning: A Step-by-Step Approach toward Ecosystem-based Management*. Intergovernmental Oceanographic Commission and Man and the Biosphere Programme. IOC Manual and Guides No. 53. UNESCO.
2. ¶2 Gacutan, J., Galparsoro, I., Pınarbaşı, K., Murillas, A., Adewumi, I.J., Praphotjanaporn, T., Johnston, E.L., Findlay, K.P., & Milligan, B.M. (2022). Marine spatial planning and ocean accounting: Synergistic tools enhancing integration in ocean governance. *Marine Policy*, 136, 104936 (DOI: 10.1016/j.marpol.2021.104936).
3. ¶3 UNESCO-IOC. (2021). *MSPglobal: Marine Spatial Planning Programme*. Intergovernmental Oceanographic Commission of UNESCO.
4. ¶4 UNCLOS Article 56 establishes the rights and duties of the coastal State in the exclusive economic zone; Articles 61-62 address conservation and utilization of living resources.
5. ¶5 UN-GGIM. (2022). *Operational Framework for Integrated Marine Geospatial Information Management (IGIF-H)*. Working Group on Marine Geospatial Information, p.5.
6. ¶6 Keith, D.A., Ferrer-Paris, J.R., Nicholson, E. and Kingsford, R.T. (eds.) (2020). *The IUCN Global Ecosystem Typology 2.0: Descriptive profiles for biomes and ecosystem functional groups*. Gland, Switzerland: IUCN. See also Keith, D.A., et al. (2022). A function-based typology for Earth's ecosystems. *Nature*, 610, 513-518.
7. ¶7 Ehler, C. & Douvère, F. (2009). *Marine Spatial Planning: A Step-by-Step Approach toward Ecosystem-based Management*. IOC Manual and Guides No. 53, UNESCO. The phased structure of MSP is widely adopted in national planning processes and aligns with the iterative account compilation cycle described in SEEA EA Chapter 14.
8. ¶8 United Nations. (2021). *System of Environmental-Economic Accounting–Ecosystem Accounting*, para 3.21.
9. ¶9 SEEA EA para 3.23: "The resolution of BSUs will depend on the analytical needs and data availability in each country."
0. ¶10 SEEA EA Chapter 4: Ecosystem extent accounts.
1. ¶11 Keith, D.A., et al. (2020). *IUCN Global Ecosystem Typology 2.0: Descriptive Profiles for Biomes and Ecosystem Functional Groups*. IUCN.
2. ¶12 ESCAP. (2022). *Ocean Accounts in the Pacific: Implementation Progress and Lessons Learned*. UN Economic and Social Commission for Asia and the Pacific. The example values are illustrative, derived from the pilot exercise methodology and expressed in hectares consistent with SEEA EA para 4.15.
3. ¶13 SEEA EA para 4.15 notes that extent accounts may be compiled in area units appropriate to the scale of analysis, including hectares and square kilometres.
4. ¶14 SEEA EA Chapter 5: Ecosystem condition accounts.
5. ¶15 SEEA EA Chapter 6: Ecosystem services accounts.
6. ¶16 United Nations. (2020). *System of Environmental-Economic Accounting for Agriculture, Forestry and Fisheries*, para 1.12.
7. ¶17 This illustrative example draws on methods described in United Nations (2021), *Monetary Valuation of Ecosystem Services and Assets for Ecosystem Accounting: Interim Version*, and applies them to a simplified MSP context. Actual trade-off analyses would require locally compiled accounts data and may involve more complex modelling of service flow dependencies.
8. ¶18 This reflects Kunming-Montreal Global Biodiversity Framework Target 3 (GBF, 2022), which calls for effective conservation and management of at least 30% of the world's land, inland waters, coastal areas, and oceans by

2030. MPA extent accounts compiled using this Circular can directly support national Target 3 progress tracking. See TG-1.3 for guidance on using accounts to monitor MPA effectiveness.

9. ¶19 The condition index (0–1 scale) is an illustrative composite derived from ECT variables using the aggregation method in TG-3.1 Section 3.4.2. Practitioners should follow TG-3.1 for variable selection and may use a locally appropriate normalisation method. Condition projections under each scenario are forward estimates subject to uncertainty; scenario comparison tables should where possible include uncertainty ranges for condition and service flow indicators. See TG-0.7 Section 3.4 for the four categories of uncertainty that apply to ocean accounts. Percentage changes rounded to nearest whole number. Values are illustrative and not drawn from a single empirical dataset. 20
0. ¶20 The condition projections in this table represent end-of-scenario-period values, not immediate post-intervention values. Under Scenario A (Conservation Priority), the condition improvement from 0.62 to 0.72 reflects cumulative recovery across the scenario time horizon (e.g., 5–10 years) following MPA establishment, traceable through successive annual account compilations rather than observable immediately.
1. ¶21 Butler, A., et al. (2019). *Marine ecosystem classification for the Australian marine environment*. Report to Parks Australia.
2. ¶22 Maes, J., et al. (2020). Mapping and Assessment of Ecosystems and their Services: An EU ecosystem assessment. *Publications Office of the European Union*.
3. ¶23 United Nations. (2021). *Monetary Valuation of Ecosystem Services and Assets for Ecosystem Accounting: Interim Version*.
4. ¶24 ESCAP. (2022). *Ocean Accounts in the Pacific: Implementation Progress and Lessons Learned*. UN Economic and Social Commission for Asia and the Pacific.
5. ¶25 Adapted from spatial planning approaches documented in national MSP processes for the North Sea region, including Germany, Denmark, and the Netherlands. Whilst not always explicitly framed as ocean accounts, these analyses apply accounting principles of spatial data integration and trade-off assessment.

DRAFT

OA and Marine Spatial Management (including MPAs)

Provides operational guidance on using Ocean Accounts to support marine spatial management decisions.

Version 0.8.1 **Status** Draft **Stability** Applied

Last updated September 2026 **Responsible officer** Dr Jordan Gacutan

Drafting AI-assisted drafting from GOAP Secretariat source materials; source list to be published at the close of consultation.

OUTCOME

This Circular sets out how Ocean Accounts support marine spatial management decisions: Marine Protected Area designation and target tracking, effectiveness monitoring, and assessment of the economic impact of spatial restrictions.

Readers will learn how to apply ecosystem accounting outputs to three decision contexts:

- MPA designation: identifying priority areas for protection using extent and condition baselines, and tracking coverage against GBF Target 3 and SDG 14.5.1
- Effectiveness monitoring: tracking conservation outcomes through time-series condition accounts, and comparing protected against unprotected areas using a counterfactual design
- Economic impact assessment: quantifying how spatial restrictions affect ecosystem service flows and the sectors that depend on them

For each, Section 3.2 states the account types required, the key indicators derived, and the operational procedure. Section 3.6 works a full before-after-control-impact assessment through to an ecosystem enhancement entry in the monetary asset account.

Indicator method is not set here. Condition variables are normalised and aggregated following [TG-2.1 Aggregate Biophysical Indicators of Environmental State](#) Sections 3.4 and 3.6, which is normative for this Circular, and asset valuation follows [TG-3.1 Asset Accounts](#) Section 3.5.3. For the broader spatial planning context within which MPAs sit, see [TG-1.2 OA and Marine Spatial Planning](#).

CONTENTS

1. Outcome	3
2. Requirements	3
3. Guidance Material	3
3.1 Marine spatial management and MPAs	3
3.2 Decision use cases for Ocean Accounts	4
3.3 Ocean accounts for monitoring ecosystem health	7
3.4 Measuring MPA effectiveness	10
3.5 Linking accounts to conservation targets	11
3.6 Worked Example: MPA Effectiveness Assessment	12
4. Acknowledgements	16
5. References	16

ABOUT THIS CIRCULAR

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DRAFT

¶1 ⓘ Framework Position

¶2 TG-1.3 applies the foundational Ocean Accounts concepts established in TG-0.1 to the specific governance context of marine spatial management and Marine Protected Areas. It bridges the Section 1 policy-decision guidance with the indicator derivation work in Section 2, demonstrating how extent and condition accounts compiled under SEEA EA methodology can directly inform MPA designation, effectiveness monitoring, and conservation finance decisions.

1. Outcome

¶1 This Circular sets out how Ocean Accounts support marine spatial management decisions: Marine Protected Area designation and target tracking, effectiveness monitoring, and assessment of the economic impact of spatial restrictions.

¶2 Readers will learn how to apply ecosystem accounting outputs to three decision contexts:

- ¶3 **MPA designation:** identifying priority areas for protection using extent and condition baselines, and tracking coverage against GBF Target 3 and SDG 14.5.1
- ¶4 **Effectiveness monitoring:** tracking conservation outcomes through time-series condition accounts, and comparing protected against unprotected areas using a counterfactual design
- ¶5 **Economic impact assessment:** quantifying how spatial restrictions affect ecosystem service flows and the sectors that depend on them

¶6 For each, Section 3.2 states the account types required, the key indicators derived, and the operational procedure. Section 3.6 works a full before-after-control-impact assessment through to an ecosystem enhancement entry in the monetary asset account.

¶7 Indicator method is not set here. Condition variables are normalised and aggregated following **TG-2.1 Aggregate Biophysical Indicators of Environmental State** Sections 3.4 and 3.6, which is normative for this Circular, and asset valuation follows **TG-3.1 Asset Accounts** Section 3.5.3. For the broader spatial planning context within which MPAs sit, see **TG-1.2 OA and Marine Spatial Planning**.

2. Requirements

- ¶1 **TG-0.1 General Introduction to Ocean Accounts** – provides foundational understanding of Ocean Accounts components, including the distinction between ecosystem assets, environmental assets, and ecosystem services.

¶2 Readers approaching Section 1 for the first time should begin with **TG-1.0 Ocean Accounting and the Blue/Ocean Economy**, the framing circular for the section, which sets out the ocean economy terminology used throughout, what an ocean account can and cannot certify about a blue economy claim, and the map from a policy question to the circular that answers it. It is recommended reading, not a prerequisite.

3. Guidance Material

3.1 Marine spatial management and MPAs

¶1 Marine spatial management encompasses the governance mechanisms through which human activities in marine areas are planned, regulated, and monitored. This includes **Marine Spatial Planning (MSP)**, which organises the spatial allocation of ocean activities, and the designation and management of **Marine Protected Areas (MPAs)**, which restrict or regulate activities in specific geographic areas to achieve conservation objectives¹. For UNCLOS maritime zone definitions

(territorial sea, EEZ, continental shelf, ABNJ), see **TG-0.6 Glossary** (Exclusive Economic Zone entry). UNCLOS requires States to take measures to “protect and preserve the marine environment” (Part XII, Article 192) whilst recognising sovereign rights over resources within Exclusive Economic Zones (EEZs)². Achieving conservation targets set by international agreements – including the Kunming–Montreal Global Biodiversity Framework target to protect 30% of marine areas by 2030 – requires reliable information systems to guide MPA designation, monitor outcomes, and support adaptive management³.

¶2 The relevance of ocean accounts for marine conservation is recognised in CBD Decision 15/24 (2022), which encourages regional efforts towards ocean accounting and economic valuation of ecosystem services for marine and coastal biodiversity, and in related COP16 decisions on marine biodiversity⁴.

***Accounting boundary note:** This Circular applies only to national marine waters (territorial sea and EEZ). Some MPAs straddle EEZ boundaries or are established under high-seas treaty frameworks – including the recently adopted BBNJ Agreement (2023) – and these scenarios introduce attribution and accounting boundary questions that are not yet standardised in SEEA EA or international guidance. Where an MPA straddles the EEZ boundary, compilers should restrict the national Ecosystem Accounting Area (EAA) to the EEZ portion and note the transboundary extent and any jointly managed area in account metadata. Guidance on fully transboundary and Areas Beyond National Jurisdiction (ABNJ) accounting is the subject of potential future GOAP Technical Guidance work. Cross-reference **TG-1.2 OA and Marine Spatial Planning** for transboundary MSP considerations.*

3.2 Decision use cases for Ocean Accounts

3.2.1 Use Case 1: MPA designation and target tracking

¶1 **Decision context:** Countries must identify priority areas for protection to meet international commitments (Kunming–Montreal GBF Target 3: 30% of marine areas by 2030; SDG 14.5: at least 10% coverage) whilst ensuring ecological representativeness and connectivity. Designation decisions require baseline information on ecosystem distribution, condition, and irreplaceability.

¶2 **Account types required:**

- ¶3 **Ecosystem extent accounts** (SEEA EA Chapter 4) – record the spatial distribution and area of each ecosystem type within the Ecosystem Accounting Area (EAA), providing the foundation for calculating protected area coverage and assessing representativeness. For marine applications, extent accounts distinguish coastal and marine ecosystem types following the IUCN Global Ecosystem Typology, including seagrass meadows (M1.1), kelp forests (M1.2), photic coral reefs (M1.3), shellfish beds (M1.4), subtidal rocky reefs (M1.6), mangroves (MFT1.2), and pelagic water column ecosystems⁵.
- ¶4 **Ecosystem condition accounts** (SEEA EA Chapter 5) – document baseline ecosystem health at the time of designation using the Ecosystem Condition Typology (ECT), enabling identification of high-integrity areas warranting protection and degraded areas requiring restoration-focused management.
- ¶5 **Governance overlay on extent accounts** (drawing on SEEA EA Section 13.5 on ocean accounts and Appendix A13.3) – record existing MPA designations aligned with the Kunming–Montreal GBF classification (IUCN categories Ia–VI and Other Effective Area-Based Conservation Measures, OECMs) and spatial overlap with ecosystem types, enabling assessment of GBF Target 3 coverage across ecosystem types. SDG 14.5.1 coverage totals can be derived

from the same account by applying the relevant national definition; see **TG-2.10 Multilateral Environmental Agreement Indicators** for indicator derivation rules.

¶6 **Key indicators derived:**

- ¶7 MPA coverage as percentage of total marine area by ecosystem type (GBF Target 3 primary; SDG 14.5.1 complementary)
- ¶8 Representation index showing which ecosystem types are under- or over-represented in protected areas
- ¶9 Baseline condition index for newly designated MPAs

¶10 **Operational procedure:** Compilers first establish the EAA corresponding to national marine waters (territorial sea and EEZ). Ecosystem extent accounts are compiled using the IUCN GET marine ecosystem classification, at the spatial resolution set out in **TG-2.12 Spatial Data Frameworks** Section 3.3, which is normative for minimum mapping units and Basic Spatial Unit resolution. The question for an MPA agency is not what resolution to specify but whether the resolution of the accounts available for the area is fine enough to resolve the designation boundaries and habitat patches the decision turns on; where it is not, TG-2.12 Section 3.3 sets out the data sources that would improve it. Each BSU is attributed to an ecosystem type and protection status (IUCN categories Ia–VI, OECM, or unprotected). The extent account aggregates BSU areas by ecosystem type and protection status, producing a cross-tabulation that reveals coverage gaps. Condition accounts are compiled for a subset of high-priority ecosystem types (typically coral reefs, seagrass, mangroves) using available monitoring data. Reference conditions are established from historical baselines, comparison with protected reference sites, or ecological modelling. The resulting extent and condition data inform spatial prioritisation, with high-condition unprotected areas and low-representation ecosystem types identified as designation priorities.

3.2.2 Use Case 2: MPA effectiveness monitoring

¶1 **Decision context:** MPA managers and conservation agencies must assess whether protection is achieving intended outcomes – maintaining or improving ecosystem condition – and whether management interventions (zoning, enforcement, restoration) require adjustment. Effectiveness assessment requires comparison of outcomes against expectations or counterfactuals⁶.

¶2 **Account types required:**

- ¶3 **Ecosystem condition accounts** (time-series) – track changes in condition variables within MPAs across accounting periods, distinguishing abiotic characteristics (physical and chemical state), biotic characteristics (compositional, structural, and functional state), and seascape characteristics (connectivity, fragmentation). The time-series enables detection of trends and attribution of changes to management interventions versus external drivers⁷.
- ¶4 **Ecosystem asset accounts** (SEEA EA Chapter 10) – record ecosystem degradation (decline in condition) and ecosystem enhancement (improvement in condition) in monetary terms, enabling integration with economic accounts⁸ and assessment of whether protection is maintaining the natural capital base.
- ¶5 **Ecosystem services accounts** (SEEA EA Chapters 6–7) – measure changes in ecosystem service flows (fish provisioning, coastal protection, carbon sequestration, recreation) associated with changes in extent and condition, linking conservation outcomes to human wellbeing.

¶6 **Key indicators derived:**

- ¶7 Ecosystem Condition Index (ECI) trends for protected versus unprotected areas
- ¶8 Area under effective protection (combining extent with condition criteria)
- ¶9 Change in ecosystem service capacity attributable to protection

¶10 **Operational procedure:** Effectiveness monitoring requires establishing a baseline condition account at or near the time of MPA designation, followed by periodic re-compilation (annually for

intensively monitored sites, every 3–5 years for standard monitoring). Condition variables are selected from the ECT based on data availability and policy relevance, with priority given to variables responsive to management interventions (e.g., coral cover, fish biomass, water quality for marine reserves). Each condition variable is normalised against its reference value to produce a condition indicator on a 0–1 scale, with indicators aggregated into an overall Ecosystem Condition Index using area-weighted averaging. Comparing ECI trends inside versus outside MPAs provides evidence of protection effectiveness. Where condition is improving, this is recorded as ecosystem enhancement in the asset account, and where declining, as degradation. Reliable effectiveness assessment rests on counterfactual comparison: compilers should establish comparable condition accounts for unprotected control sites matched to MPA characteristics.

3.2.3 Use Case 3: Economic impact assessment of spatial restrictions

¶1 **Decision context:** Policymakers must assess the economic implications of MPA restrictions on fishing, tourism, and other marine uses, balancing conservation benefits against livelihood impacts and economic opportunity costs. This requires integrated environmental-economic analysis.

¶2 **Account types required:**

- ¶3 **Ecosystem services supply and use accounts** (SEEA EA Chapters 6–7) – record flows of provisioning services (wild fish, genetic resources), regulating services (coastal protection, climate regulation), and cultural services (recreation, education) from marine ecosystems to economic beneficiaries, enabling quantification of service flows before and after spatial restrictions.
- ¶4 **Monetary ecosystem services accounts** (SEEA EA Chapter 9) – value ecosystem services in monetary units consistent with SNA conventions, enabling comparison of ecosystem service values with GDP contributions from extractive industries.
- ¶5 **Extended supply-use tables** (SEEA EA Chapter 11) – integrate ecosystem services with conventional economic production, revealing dependencies of ocean-based industries on ecosystem service inputs and distributional effects of spatial restrictions across sectors.

¶6 **Key indicators derived:**

- ¶7 Ecosystem service value per hectare by protection status
- ¶8 Economic dependency ratio (ocean industry GDP / ecosystem service value)
- ¶9 Distributional incidence of MPA restrictions across sectors and communities

¶10 **Operational procedure:** Economic impact assessment begins with ecosystem services supply accounts that quantify service flows in physical units (tonnes of fish provisioned, volume of coastal protection service, recreation visitor-days). Supply is attributed to specific ecosystem assets (MPAs, adjacent fishing grounds) using spatial models that link ecosystem characteristics to service generation. Use accounts record which economic units (fishing enterprises, tourism operators, coastal households) receive these services. Monetary valuation applies methods consistent with SEEA EA Chapter 9: exchange values for provisioned fish, avoided damage cost for coastal protection, travel cost or contingent valuation for recreation. Comparing service values before and after MPA designation reveals net economic effects. Where MPA restrictions reduce extractive service flows (reduced fishing area) but enhance long-term service capacity (stock recovery, habitat restoration), the extended supply-use framework enables integrated assessment of short-term costs versus long-term benefits.

¶11 Where primary valuation data (travel cost surveys, contingent valuation studies) are not available, compilers should apply the following tiered framework:

- ¶12 **Tier 1 – Primary valuation study available:** Apply stated methods directly (exchange values, avoided damage cost, travel cost, contingent valuation).
- ¶13 **Tier 2 – No primary study; comparable study available in region:** Apply benefit transfer from a comparable regional study. Compilers must document transfer errors and provide an ex-

explicit comparability assessment (ecosystem type, service type, socio-economic context, and study quality) following SEEA EA Chapter 9 guidance.

- ¶14 **Tier 3 – No comparable study available:** Report physical supply-use accounts only. Flag monetary values as not available and note this limitation in the statistical disclosure metadata.

¶15 For detailed guidance on ecosystem services valuation, see **TG-2.4 Environmental (including Ecosystem) Goods and Services**.

3.3 Ocean accounts for monitoring ecosystem health

¶1 The accounting approach rests on three properties: completeness (covering all relevant ecosystem types within the MPA boundary), consistency (applying the same classifications and methods across accounting periods), and coherence (ensuring data from different sources can be integrated)⁹.

3.3.1 Establishing baseline accounts

¶1 When an MPA is designated, compiling baseline accounts establishes the starting point against which future changes can be measured. Baseline ecosystem extent accounts document the spatial distribution of ecosystem types at the time of protection, providing the foundation for monitoring changes in habitat coverage – for example, detecting expansion or contraction of seagrass meadows or coral reef area.

¶2 Condition variables are selected and normalised following the procedure in **TG-2.1 Aggregate Biophysical Indicators of Environmental State** Sections 3.2–3.4, which is normative for this Circular. Every condition indicator in this Circular, including those in the worked example in Section 3.6, is derived using the TG-2.1 Section 3.4.1 transformation $\text{Indicator} = (V - L) / (U - L)$, with the inverse-polarity and logarithmic-scale variants set out there. Both an upper reference (**U**) and a lower reference (**L**) are required for every linearly transformed variable; an upper reference alone is not sufficient. For marine ecosystems, relevant condition variables may include those summarised in Table 1.3.1 below. In the Ocean Accounts Framework (TG-0.1 General Introduction to Ocean Accounts), the economic pressures that drive changes in the chemical state variables – such as nutrient loading and pollution discharge – correspond to Edge E1 (pollution/residuals from economy to environment).

¶3 **Table 1.3.1: Marine ecosystem condition variables relevant to MPA baselines**

Class	Variables
Abiotic physical state	Water temperature, salinity, turbidity, current patterns, bathymetric characteristics.
Abiotic chemical state	Dissolved oxygen, pH (ocean acidification), nutrient concentrations, pollutant levels.
Biotic compositional state	Species richness, community composition, abundance of indicator species, presence of threatened species.
Biotic structural state	Coral cover percentage, seagrass canopy height and density, kelp forest biomass, mangrove stem density.
Biotic functional state	Primary productivity, fish recruitment rates, trophic structure, decomposition rates.
Seascape characteristics	Habitat patch size distribution, connectivity between reef systems, fragmentation of coastal wetlands.

¶4 SEEA EA recommends measuring condition relative to a reference condition that reflects, where possible, the natural or undegraded state of the ecosystem (SEEA EA para 5.69)¹⁰. For marine ecosystems, establishing appropriate reference conditions may require drawing on historical data, scientific literature, expert knowledge, or comparison with similar unimpacted areas.

¶5 Table 1 illustrates a simplified ecosystem condition account structure for an MPA.

¶6 **Table 1: Illustrative ecosystem condition account for a marine protected area**

Condition Variable	Indicator	U (upper reference)	L (lower reference)	Baseline (Year 1)	Year 5	Condition Index (Year 5)
Abiotic: Physical						
Water clarity	Secchi depth (m)	25	5	18	21	0.80
Abiotic: Chemical						
Ocean pH	pH units	8.2	n/a ¹¹	8.05	8.03	0.70
Biotic: Compositional						
Fish species richness	Species count	120	30	85	102	0.80
Biotic: Structural						
Coral cover	% cover	40	5	22	28	0.66
Seagrass density	Shoots/m ²	800	100	450	580	0.69
Seascape						
Habitat connectivity	Index (0-1)	0.9	0.2	0.6	0.65	0.64

¶7 Lower reference values in this illustration are indicative. Compilers must establish both anchors from national or regional evidence and document them, following TG-2.1 Section 3.4.2.

3.3.2 Condition indices and aggregation

¶1 Individual condition variables can be aggregated into composite condition indices to provide summary assessments of ecosystem health. An ECI value of 1 indicates reference condition, whilst values below 1 indicate degradation¹².

¶2 Aggregation methods, the default among them, and their implications for interpretation are set out in **TG-2.1** Section 3.6. The worked example in Section 3.6 of this Circular uses the arithmetic mean across condition variables, and the area-weighted mean across habitat sub-accounts, in both cases following TG-2.1.

¶3 Figure 1.3.1 sets out the four sequential steps by which heterogeneous condition variables are measured, normalised against baseline condition, compiled and aggregated to a composite ECI, and then tracked across accounting periods.

1 Measure condition variables

natural units · per ecosystem accounting area

Each selected variable is observed in its own physical unit for the ecosystem asset (one MPA reef-and-seagrass asset shown).

CONDITION VARIABLE	MEASURED (CURRENT)	BASILINE CONDITION
Water clarity (Secchi depth)	21 m	25 m
Ocean pH	8.03	8.2
Fish species richness	102 species	120
Coral cover	28 %	40 %
Seagrass density	580 shoots/m ²	800
Habitat connectivity	0.65 index	0.90

Abiotic Biotic Seascape (Ecosystem Condition Typology classes)

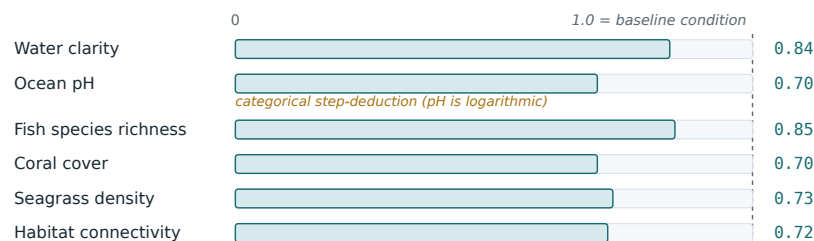
rescale to 0-1

2 Normalise against baseline condition

dimensionless 0-1 indicator

indicator = observed ÷ baseline condition, capped at 1.0 (1.0 = at baseline; lower = degraded).

Variables now share a common scale, which is what makes them comparable for aggregation in step 3.

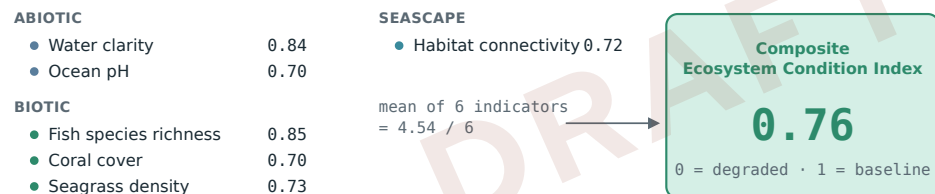


compile & aggregate

3 Compile condition account & aggregate

arithmetic mean → composite ECI

The 0-1 indicators are entered in the condition account, grouped by ECT class, then aggregated (default: arithmetic mean).



track over time

4 Track composite ECI over accounting periods

effectiveness monitoring

Re-compiling the account each period yields a trajectory, assessed against a management target and a critical threshold.

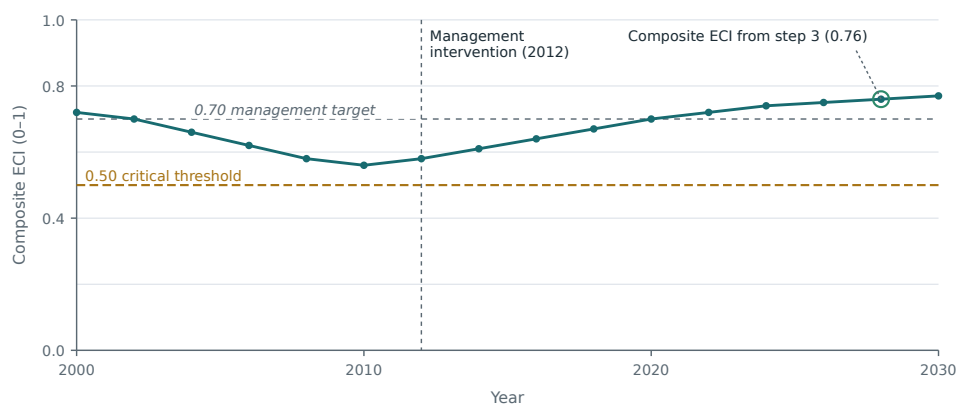


Figure 1.3.1 Four panels show how measured condition variables become a composite MPA Ecosystem Condition Index tracked against management thresholds. Values are illustrative. Scale is 0–1 against each variable’s own baseline, not min–max across variables.

Source: SEEA EA 2024 ch. 5 (ecosystem condition accounts, variables, indicators and reference levels); IUCN-WCPA protected-area management-effectiveness framework. See TG-1.3 (MPA condition assessment) and TG-2.1 (aggregate biophysical indicators).

Adapted from: SEEA EA 2024 §5.69 and Table 5.1 (condition indicators, reference levels, categorical abiotic variables).

¶4 For MPA management, condition indices can be constructed at different scales: individual ecosystem assets (e.g., a specific reef), ecosystem types within the MPA (e.g., all coral reef area), or the entire protected area. Tracking changes in these indices over time provides a quantitative basis for assessing whether management interventions are achieving conservation objectives.

3.4 Measuring MPA effectiveness

3.4.1 Accounting for ecosystem degradation and enhancement

¶1 SEEA EA provides explicit accounting treatments for changes in ecosystem condition.

Ecosystem enhancement is defined as “the increase in the value of an ecosystem asset over an accounting period that is associated with an improvement in the condition of the asset during that accounting period” (SEEA EA para 10.15), whilst **ecosystem degradation** is defined as “the decrease in the value of an ecosystem asset over an accounting period that is associated with a decline in the condition of the ecosystem asset during that accounting period” (SEEA EA para 10.21)¹³. These accounting entries enable tracking of whether ecosystems within MPAs are improving (net enhancement), stable (no net change), or declining despite protection (net degradation).

¶2 The accounting framework distinguishes between changes due to human activity (recorded as degradation or enhancement) and changes due to natural processes (recorded as other changes in volume). This distinction is analytically important for MPA assessment – for example, distinguishing coral decline due to reduced local pressures (management success) from decline due to thermal stress associated with climate change (external driver). Attribution of observed condition changes to drivers should draw on expert assessment, scientific literature, or statistical attribution studies.

¶3 Where the source or causality of a condition change cannot be reliably attributed to either anthropogenic or natural drivers, compilers should **not** attempt to disaggregate the change between “degradation” and “other volume changes.” Instead, record the total condition change without attribution and document the limitation in account metadata. Recording the change without attribution mirrors the treatment in extent accounts, where planned and unplanned additions and reductions are recorded separately only when reliably known (SEEA EA para 10.21; see also SEEA EA guidance on extent-account planned/unplanned changes). Cross-reference **TG-2.8 Climate Change Indicators** for attribution approaches when climate drivers are a principal confound.

¶4 Where decline is observed in both protected and unprotected areas and scientific evidence links the decline to climate-driven thermal stress, the change may be attributed to natural processes (other volume changes) rather than management failure. Where decline is observed only in poorly enforced MPAs but not in well-enforced sites experiencing similar environmental conditions, the differential may be attributed to management effectiveness and recorded as anthropogenic degradation.

3.4.2 Ecosystem services as effectiveness indicators

¶1 Changes in ecosystem services flow provide another dimension for assessing MPA effectiveness. Table 3.4.2 below summarises four ecosystem service effectiveness indicators that accounts can track to assess whether protection is maintaining or enhancing the capacity of marine ecosystems to deliver services.

¶2 **Table 3.4.2: Ecosystem service effectiveness indicators for MPA assessment**

Ecosystem Service	Effectiveness Indicator
Fish provisioning	Monitoring fish biomass and catch per unit effort in areas adjacent to no-take zones to assess spillover effects
Coastal protection	Measuring changes in wave attenuation capacity of reef systems or mangrove forests within the MPA
Carbon sequestration	Quantifying carbon storage in seagrass meadows, mangroves, and other blue carbon ecosystems
Recreation and tourism	Recording visitor numbers, satisfaction levels, and economic contributions from MPA-based tourism

¶3 For detailed guidance on compiling ecosystem services accounts for marine ecosystems, see **TG-2.4 Environmental (including Ecosystem) Goods and Services**. The combined presentation of ecosystem and economic accounts is addressed in **TG-3.8 Combined Presentations**.

3.4.3 Counterfactual analysis

¶1 Credible effectiveness assessment often requires counterfactual analysis – comparing outcomes within the MPA against what would have occurred without protection. The counterfactual approach requires selecting control sites that are comparable to the MPA in terms of baseline ecosystem characteristics, environmental conditions, and human pressure levels, but differ in protection status. Condition accounts are compiled for both MPA and control sites using identical variable selection, reference conditions, and aggregation methods. The difference in condition trends between MPA and control sites provides an estimate of the protection effect.

¶2 Three principal counterfactual designs are applicable:

- ¶3 **Before-After-Control-Impact (BACI)**: Strengthens the effectiveness estimate by controlling for regional trends that affect both sites where baseline data from before designation exist.
- ¶4 **Matching-based approaches**: Applicable where baseline data from before designation are unavailable but a pool of candidate control sites with comparable characteristics exists.
- ¶5 **Regression discontinuity designs**: Applicable where a continuous spatial or temporal running variable at the MPA boundary can be defined.

¶6 Each design should be applied according to standard counterfactual-design practice for the specific study context. Minimum data requirements depend on the research question, expected effect size, and spatial and temporal grain of available monitoring data; no universal thresholds are prescribed here. Where none of the designs is feasible due to data limitations, compilers should report descriptive condition trends with an explicit caveat that causal attribution is not supported by the available data.

3.5 Linking accounts to conservation targets

3.5.1 SDG 14 and marine conservation

¶1 The 2030 Agenda for Sustainable Development includes SDG 14 “Life Below Water” with targets directly relevant to marine spatial management. SDG Target 14.5 calls for countries to “conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information,” with indicator 14.5.1 measuring “coverage of protected areas in relation to marine areas”¹⁴. SDG Target 14.2 addresses sustainable management and protection of marine and coastal ecosystems, monitored through indicator 14.2.1 on “proportion of national exclusive economic zones managed using ecosystem-based approaches.”

¶2 Ecosystem extent accounts can directly inform reporting on protected area coverage, whilst condition and services accounts support assessment of whether protection is achieving intended ecosystem management outcomes. The alignment between ocean accounts and SDG 14 indicators is detailed in **TG-2.10 Multilateral Environmental Agreement Indicators**.

3.5.2 Kunming–Montreal Global Biodiversity Framework

¶1 The Kunming–Montreal Global Biodiversity Framework, adopted at CBD COP15 in December 2022, establishes the ambition to protect 30% of marine areas by 2030 (Target 3) and to ensure that areas under protection are “effectively conserved and managed” through “ecologically representative, well-connected and equitably governed systems of protected areas”¹⁵. The Framework explicitly calls for integration of biodiversity values into national accounting processes (Target 14), and related CBD decisions have recognised the role of ocean accounts in supporting marine conservation⁴.

¶2 The GBF Target 3 coverage classification is the primary framing for the governance overlay on extent accounts in this Circular (see Section 3.2.1). The GBF classification distinguishes IUCN categories Ia–VI¹⁶ and Other Effective Area-Based Conservation Measures (OECMs) as defined under the KM-GBF. SDG 14.5.1 coverage totals can be derived from the same account as a complementary indicator¹⁷. Compilers should not maintain duplicate or competing coverage tables.

3.5.3 Corporate reporting and private-sector engagement

¶1 The Taskforce on Nature-related Financial Disclosures (TNFD) has developed recommendations for businesses to assess and report on nature-related dependencies, impacts, risks, and opportunities. Ocean Accounts compiled for MPAs provide data on ecosystem condition and services that can contribute to such assessments. Guidance on mapping ocean account outputs to specific corporate disclosure frameworks – including the TNFD LEAP approach (Locate, Evaluate, Assess, Prepare) – falls within the scope of private-sector-focused Technical Guidance circulars rather than this NSO-facing circular. For organisations seeking to use national ocean account statistics in corporate reporting, the mapping is set out in **TG-1.11 OA and the Private Sector** Section 3.3, with the LEAP approach in Section 3.2.

3.5.4 Adaptive management and decision cycles

¶1 Accounts support adaptive management by providing a systematic basis for tracking outcomes and adjusting strategies. The cyclical nature of accounting – with regular updates to extent, condition, and services data – aligns with adaptive management frameworks that emphasize learning from management interventions and adjusting approaches based on observed results.

¶2 For MPA managers, accounts can inform decisions such as:

- ¶3 Zoning adjustments based on observed changes in ecosystem condition
- ¶4 Resource allocation priorities based on identification of degraded areas requiring restoration
- ¶5 Stakeholder engagement supported by clear communication of ecosystem trends
- ¶6 Investment decisions supported by assessment of ecosystem services benefits

3.6 Worked Example: MPA Effectiveness Assessment

¶1 This section presents a synthetic worked example demonstrating how ecosystem condition accounts can be applied to assess MPA effectiveness using a before–after–control–impact (BACI) design. All data are hypothetical but structured to illustrate operational procedures.

3.6.1 Scenario

¶1 A coastal nation designated a 15,000-hectare marine protected area in 2018 to protect coral reef ecosystems. The MPA includes 3,500 ha of coral reef habitat, 4,000 ha of seagrass meadows, and 7,500 ha of pelagic water column. Management objectives include maintaining coral cover above 30%, improving fish biomass to within 20% of unfished levels, and ensuring water quality meets reference conditions for pH and nutrient levels. A control site of comparable size and baseline characteristics but without protection restrictions was identified 50 km away.

¶2 The worked example in Sections 3.6.2–3.6.7 focuses on the **coral reef** sub-account (3,500 ha). Section 3.6.8 extends the example to the **seagrass meadow** sub-account (4,000 ha) and demonstrates area-weighted ECI aggregation across benthic habitat types.

3.6.2 Baseline condition account (2018)

¶1 At the time of designation, baseline condition accounts were compiled for both the MPA and control site using field surveys, remote sensing, and water quality monitoring. The following condition variables were measured:

¶2 **Table 2: Baseline condition variables for MPA and control site (2018)**

ECT Class	Variable	Unit	Polarity	U (upper reference)	L (lower reference)	MPA Baseline	Control Baseline
Physical state	Water clarity	Secchi depth (m)	Normal	20	4	14	13
Chemical state	pH	units	Logarithmic	8.2	n/a	8.05	8.04
Chemical state	DIN	mg/L	Inverse	0.1	1.0	0.4	0.5
Compositional	Fish biomass	kg/ha	Normal	600	60	180	170
Structural	Coral cover	%	Normal	40	5	22	20
Structural	Seagrass density	shoots/m ²	Normal	750	75	400	380

¶3 Notes: DIN = dissolved inorganic nitrogen. Upper reference values are based on regional historical data and comparison with remote pristine sites; lower reference values on regional records of fully degraded sites of the same habitat type. Both anchors are required by the TG-2.1 Section 3.4.1 transformation and must be documented (TG-2.1 Section 3.4.2). pH uses the categorical step deduction in TG-2.1 Section 3.4.1 and takes no lower anchor. Fish biomass reference represents a single-species maximum sustainable yield benchmark (B_{MSY} estimated at approximately 40% of unfished biomass) used here for the provisioning service assessment context (Use Case 3); for ecosystem-level condition accounting (Use Cases 1 and 2), an unfished or near-pristine biomass reference is more appropriate. See SEEA EA Chapter 5 (reference conditions) and FAO Technical Guidelines for Responsible Fisheries No. 4.¹⁸

3.6.3 Normalising condition indicators

¶1 Each condition variable is normalised to a 0–1 scale using the transformation in **TG-2.1** Section 3.4.1, applying the polarity recorded for it in Table 2:

- ¶2 **Normal polarity** (water clarity, fish biomass, coral cover, seagrass density): $\text{Indicator} = (V - L) / (U - L)$
- ¶3 **Inverse polarity** (DIN): $\text{Indicator} = (L - V) / (L - U)$
- ¶4 **Logarithmic scale** (pH): the categorical step deduction, $\text{Indicator} = 1.00 - (0.10 \times n)$, where n is the number of complete 0.05-unit steps in the deviation D

¶5 Indicators are capped at 1.00 and clamped at 0; any observation beyond an anchor is noted in account metadata. Composite indices below use the arithmetic mean across the six variables, following TG-2.1 Section 3.6.

¶6 *Worked check (MPA water clarity, 2018):* $(14 - 4) / (20 - 4) = 10 / 16 = 0.63$. *Worked check (MPA DIN, 2018):* $(1.0 - 0.4) / (1.0 - 0.1) = 0.6 / 0.9 = 0.67$. *Worked check*

(MPA pH, 2018): $D = 8.2 - 8.05 = 0.15$, which falls in the $0.15 \leq D < 0.20$ band, so $n = 3$ and the indicator is $1.00 - 0.30 = 0.70$.

¶7 **Table 3: Baseline condition indicators (2018)**

Variable	MPA Indicator	Control Indicator
Water clarity	0.63	0.56
pH	0.70	0.70
DIN	0.67	0.56
Fish biomass	0.22	0.20
Coral cover	0.49	0.43
Seagrass density	0.48	0.45
Mean ECI	0.53	0.48

3.6.4 Monitoring results (2024)

¶1 After six years of protection and enforcement, condition monitoring was repeated at both sites using identical protocols.

¶2 **Table 4: Monitoring results and condition indicators (2024)**

Variable	MPA 2024	MPA Indicator	Control 2024	Control Indicator	Change (MPA)	Change (Control)
Water clarity (m)	17	0.81	12	0.50	+0.18	-0.06
pH	8.00	0.60 ¹⁹	7.98	0.60 ¹⁹	-0.10	-0.10
DIN (mg/L)	0.25	0.83	0.55	0.50	+0.16	-0.06
Fish biomass	340	0.52	160	0.19	+0.30	-0.01
Coral cover (%)	30	0.71	18	0.37	+0.22	-0.06
Seagrass (shoots/m ²)	520	0.66	350	0.41	+0.18	-0.04
Mean ECI		0.69		0.43	+0.16	-0.05

3.6.5 Effectiveness interpretation

¶1 The MPA site recorded improvement in condition (ECI increased from 0.53 to 0.69), whilst the control site recorded decline (0.48 to 0.43). The treatment effect – the difference in change between MPA and control – is +0.21 points on the ECI scale (MPA change +0.16; control change -0.05; treatment effect = $0.16 - (-0.05) = 0.21$), indicating that protection contributed approximately 21 percentage points of condition improvement beyond background environmental trends.

3.6.6 Ecosystem asset accounting

¶1 The condition improvement in the MPA is recorded as **ecosystem enhancement** in the monetary ecosystem asset account. The two method choices this requires – perpetuity or finite horizon, and the functional form linking condition to service capacity – are set out in **TG-3.1 Asset Accounts** Section 3.5.3 and must be documented in account metadata.

¶2 This illustration applies a perpetuity, on the basis that the designation has no terminal date, and a linear condition-to-service scaling as a screening-level approximation only. Both are choices a compiler must justify rather than defaults.

1. ¶3

Baseline asset value (2018): the coral reef ecosystem within the MPA (3,500 ha) generated ecosystem services valued at USD 500/ha/year at baseline condition (ECI = 0.53). At a 4%

discount rate in perpetuity, the baseline asset value = (USD 500/ha × 3,500 ha) / 0.04 = USD 43.75 million.

2. ¶4

Current asset value (2024): after condition improvement to ECI = 0.69, linear scaling gives a service flow of USD 500/ha × (0.69 / 0.53) = USD 650.94/ha/year. Current asset value = (USD 650.94/ha × 3,500 ha) / 0.04 = USD 56.96 million.

3. ¶5

Ecosystem enhancement: the increase in asset value attributable to improved condition = USD 56.96M – USD 43.75M = USD 13.21 million over the six-year period, or approximately USD 2.20 million per year on average.

¶6 Because the scaling is linear, the enhancement figure moves in direct proportion to the ECI ratio, and any error in the condition indicators propagates undamped into the asset value. See **TG-2.4 Environmental (including Ecosystem) Goods and Services** for service flow estimation methods.

3.6.7 Limitations and caveats

¶1 This worked example simplifies several aspects of real-world MPA assessment:

- ¶2 **Attribution:** The analysis assumes the difference between MPA and control outcomes is attributable to protection, but other factors (differential enforcement, community engagement, coincident management interventions) could contribute.
- ¶3 **Baseline comparability:** Perfect matching of control sites is rarely achievable; residual differences in baseline characteristics may confound treatment effects.
- ¶4 **Spatial heterogeneity:** Within-MPA variation in condition may be substantial; the example presents aggregate figures but operational assessments should examine spatial patterns.
- ¶5 **Temporal lags:** Ecosystem responses to protection occur at different timescales; six years may be insufficient for slow-responding variables (e.g., structural complexity, apex predator recovery).
- ¶6 **Condition-to-service scaling:** Linear scaling is used here as a screening-level approximation only. Operational asset valuations should apply empirically calibrated functional forms, following TG-3.1 Section 3.5.3.
- ¶7 **Reference anchors:** Both the upper and lower reference values in Table 2 are illustrative. Because the transformation is bounded by the two anchors, the choice of lower reference moves every indicator and therefore the treatment effect; anchors must be evidenced and documented (TG-2.1 Section 3.4.2).

3.6.8 Extending to seagrass and other benthic sub-accounts

¶1 The same BACI procedure applied to the coral reef sub-account in Sections 3.6.2–3.6.7 can be extended to seagrass meadows and other benthic habitats present within the MPA. Appropriate condition variables for a seagrass sub-account include percent cover, shoot density (shoots/m²), and epiphyte load (as an indicator of eutrophication pressure). Other benthic sub-types (e.g., soft-sediment benthos, shellfish beds) should use variables appropriate to their IUCN GET functional group. So that managers and reporting agencies can distinguish habitat-specific trends from over-all MPA condition, sub-type ECIs should be **reported separately alongside the aggregate MPA ECI** – not only as components of the aggregate.

¶2 The MPA-wide aggregate is the area-weighted mean of the sub-type ECIs, following **TG-2.1** Section 3.6.1.

¶3 **Table 5: Illustrative area-weighted ECI aggregation across benthic sub-accounts (2024)**

Sub-account	Area (ha)	ECI (2024)	Area × ECI
Coral reef	3,500	0.69	2,415

Sub-account	Area (ha)	ECI (2024)	Area × ECI
Seagrass meadow	4,000	0.65*	2,600
Total / Aggregate	7,500	0.67	5,015

¶4 *Illustrative seagrass ECI based on percent cover, shoot density, and epiphyte load indicators, normalised against upper and lower references using the same TG-2.1 Section 3.4.1 transformation as the coral reef sub-account.*

¶5 Pelagic sub-accounts (7,500 ha in this scenario) are excluded from this aggregation for want of condition data, and the excluded area is stated with the index as TG-2.1 Section 3.6.1 requires. Practitioners with pelagic condition data (e.g., chlorophyll-a, dissolved oxygen, plankton biomass) may extend the area-weighted ECI to include a pelagic component using those variables and the same normalisation procedure.

4. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

5. References

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- ¶3 Convention on Biological Diversity. (2022). *Kunming-Montreal Global Biodiversity Framework*. CBD/COP/15/L.25.
- ¶4 Convention on Biological Diversity. (2022). CBD Decision 15/24 on ocean accounting for conservation and sustainable management of marine and coastal biodiversity; and related COP16 decisions on marine biodiversity.
- ¶5 Keith, D.A., Ferrer-Paris, J.R., Nicholson, E. and Kingsford, R.T. (eds.) (2020). *The IUCN Global Ecosystem Typology 2.0: Descriptive profiles for biomes and ecosystem functional groups*. Gland, Switzerland: IUCN.
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- ¶7 United Nations. (2021). *System of Environmental-Economic Accounting – Ecosystem Accounting*. Chapter 5: Ecosystem condition accounts; Table 5.1: Ecosystem Condition Typology (ECT).
- ¶8 United Nations. (2021). *System of Environmental-Economic Accounting – Ecosystem Accounting*. Chapter 11: Integration with the SNA.
- ¶9 United Nations. (2021). *System of Environmental-Economic Accounting – Ecosystem Accounting*. Chapter 2: Principles of ecosystem accounting.
- ¶10 United Nations. (2021). *System of Environmental-Economic Accounting – Ecosystem Accounting*. Para 5.69: Reference conditions.
- ¶11 pH is measured on a logarithmic scale and does not use the linear two-anchor transformation. The categorical step deduction in TG-2.1 Section 3.4.1 applies instead: reference 8.2, observed 8.03, deviation 0.17 units, which falls in the $0.15 \leq D < 0.20$ band, so $n = 3$ and the indicator = $1.00 - 0.30 = 0.70$.
- ¶12 United Nations. (2021). *System of Environmental-Economic Accounting – Ecosystem Accounting*. Section 5.4: Ecosystem condition indices.
- ¶13 United Nations. (2021). *System of Environmental-Economic Accounting – Ecosystem Accounting*. Chapter 10: Ecosystem asset accounts, paras 10.15 (enhancement) and 10.21 (degradation).
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- ¶16 Day, J., et al. (2019). *Guidelines for Applying the IUCN Protected Area Management Categories to Marine Protected Areas*. Second Edition. IUCN.
- ¶17 United Nations. (2021). *System of Environmental-Economic Accounting – Ecosystem Accounting*. Chapter 12: Links to broader assessment frameworks.
- ¶18 FAO. (1997). *FAO Technical Guidelines for Responsible Fisheries No. 4: Fisheries Management*. Rome: FAO. See also FAO Fisheries Technical Paper 347 (Garcia, 1994) for biological reference points including B_{MSY}.
- ¶19 Both pH indicators use the categorical step deduction in TG-2.1 Section 3.4.1. MPA pH 8.00: $D = 0.20$, which falls in the $0.20 \leq D < 0.25$ band, so $n = 4$ and the indicator = $1.00 - 0.40 = 0.60$. Control pH 7.98: $D = 0.22$, also

in the $0.20 \leq D < 0.25$ band, so $n = 4$ and the indicator = 0.60. Control mean ECI = $(0.50 + 0.60 + 0.50 + 0.19 + 0.37 + 0.41) / 6 = 2.57 / 6 = 0.428$, rounded to 0.43. Rounding convention: individual indicators are reported to two decimal places, and the mean ECI is rounded to two decimal places after summing the six rounded indicators.

DRAFT

OA and Sustainable Ocean Planning

Translates ocean accounting outputs into evidence for four planning use cases: ocean economy roadmaps, SDG 14 planning, integrated coastal management and marine spatial planning.

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OUTCOME

Practitioners will gain practical understanding of four decision use cases. Sustainable ocean economy roadmaps integrate economic development targets with ecosystem health thresholds. SDG 14 implementation planning uses accounting-derived indicators to track progress on marine pollution, ecosystem management, fisheries sustainability, and economic benefits. Integrated coastal management connects land-based pressures to marine outcomes. Marine Spatial Planning organises the spatial allocation of ocean activities using coherent, integrated data that supports analysis of trade-offs and synergies.

Section 3.2 is the core of the Circular: Table 3.2.1 maps indicator to account source to SDG target, and Table 3.2.2 maps each planning use case to the accounts it requires, the indicators derived from them, and the decisions those indicators inform. Table 3.2.2 also serves as the account-prioritisation aid for countries able to compile only one or two account types at first.

Section 3.5 routes to the circular that treats each planning framework in depth, and Section 3.6 works a sustainability dashboard through from baseline accounts to scenario projections to a cabinet-level presentation. Where and how to stand up an accounting programme in the first place is treated in [TG-0.8 Implementation Readiness Assessment](#) rather than here.

CONTENTS

1. Outcome	3
2. Requirements	3
3. Guidance Material	3
3.1 What is sustainable ocean planning?	3
3.2 Sustainability indicators from ocean accounts	4
3.3 Balancing economic and environmental objectives	7
3.4 Integration with SDG monitoring	9
3.5 Planning frameworks and ocean accounts	10
3.6 Worked example: Ocean sustainability dashboard	11
4. Acknowledgements	15
5. References	15

ABOUT THIS CIRCULAR

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¶1 ⓘ Framework Position

¶2 TG-1.4 is a Section 1 (Decision-Making) circular. It sits at the intersection of the accounting outputs produced in Sections 2, 3, and 4 and the governance processes that consume them. Its function is to translate structured accounting information into evidence for four specific planning use cases: sustainable ocean economy roadmaps, SDG 14 implementation planning, integrated coastal management, and Marine Spatial Planning. It applies the foundational concepts established in **TG-0.1 General Introduction to Ocean Accounts** to concrete decision contexts. TG-1.4 is a companion to **TG-1.2 Marine Spatial Planning**, which provides detailed MSP-specific guidance, and complements the other Section 1 circulars covering national budget processes, SDG reporting, and EBM. Practitioners compiling accounts for the use cases described here should follow the relevant Section 2, 3, and 4 circulars for account compilation methodology.

1. Outcome

¶1 Practitioners will gain practical understanding of four decision use cases. **Sustainable ocean economy roadmaps** integrate economic development targets with ecosystem health thresholds. **SDG 14 implementation planning** uses accounting-derived indicators to track progress on marine pollution, ecosystem management, fisheries sustainability, and economic benefits. **Integrated coastal management** connects land-based pressures to marine outcomes. **Marine Spatial Planning** organises the spatial allocation of ocean activities using coherent, integrated data that supports analysis of trade-offs and synergies.

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¶3 Section 3.5 routes to the circular that treats each planning framework in depth, and Section 3.6 works a sustainability dashboard through from baseline accounts to scenario projections to a cabinet-level presentation. Where and how to stand up an accounting programme in the first place is treated in **TG-0.8 Implementation Readiness Assessment** rather than here.

2. Requirements

- ¶1 **TG-0.1 General Introduction to Ocean Accounts** – provides foundational understanding of Ocean Accounts, the Ocean Accounts Framework, and the conceptual basis for measuring sustainability through changes in natural capital

¶2 Readers approaching Section 1 for the first time should begin with **TG-1.0 Ocean Accounting and the Blue/Ocean Economy**, the framing circular for the section, which sets out the ocean economy terminology used throughout, what an ocean account can and cannot certify about a blue economy claim, and the map from a policy question to the circular that answers it. It is recommended reading, not a prerequisite.

3. Guidance Material

3.1 What is sustainable ocean planning?

¶1 Sustainable ocean planning encompasses the processes through which governments, communities, and other stakeholders make decisions about how ocean and coastal areas will be used and managed. These decisions concern the spatial allocation of activities, the regulation of resource extraction, the conservation of ecosystems, and the pursuit of economic objectives in ways that maintain or enhance the long-term productivity and resilience of marine environments. As established in **TG-0.1**, sustainable ocean development entails three interconnected objectives: advancing

ocean-based economic activities that provide sustainable livelihoods, ensuring equitable distribution of benefits across society, and conserving and enhancing marine ecosystems and their ecological processes¹.

¶2 The practical challenge for sustainable ocean planning lies in reconciling competing demands on ocean space and resources. Fishing communities, shipping industries, offshore energy developers, tourism operators, conservation interests, and coastal residents all have legitimate claims on how marine areas should be managed. Planners require integrated information systems that can reveal the relationships between these different uses and the environmental conditions that underpin them. Traditional approaches to ocean management have often proved inadequate to the complexity of managing socio-ecological systems where environmental health underpins economic productivity, as they address individual sectors or issues in isolation².

Decision use cases for sustainable ocean planning

¶1 Ocean accounts support four principal decision use cases in sustainable ocean planning (see Section 3.5 for planning framework descriptions and Table 3.2.2 for required accounts).

¶2 **Sustainable ocean economy roadmaps** integrate economic development targets with ecosystem health thresholds. Asset accounts for fish stocks, mangroves, coral reefs, and seagrass meadows provide baseline values against which depletion or enhancement can be measured (**TG-3.1 Asset Accounts**). Ocean economy thematic accounts quantify current contributions to GDP and employment (**TG-2.5 Structure and Function of the Ocean Economy**). Combined presentations of natural and produced capital stocks enable planners to assess whether blue economy growth is generating real wealth or converting natural capital into economic output (**TG-3.8 Combined Presentations**). The 2025 SNA treatment of depletion as a production cost provides a direct mechanism for this assessment: when extraction exceeds sustainable yield, net domestic product falls, and the fall registers unsustainable resource use³.

¶3 **SDG 14 implementation planning** uses accounting-derived indicators to track progress on marine pollution, ecosystem management, fisheries sustainability, and economic benefits from sustainable ocean use. Physical extent accounts map directly to SDG indicator 14.5.1 (marine protected area coverage). Asset accounts for fish stocks support indicator 14.4.1 (proportion of fish stocks within biologically sustainable levels). Flow accounts for residuals support indicator 14.1.1 (coastal eutrophication and floating plastic debris density). Economic accounts enable assessment of the economic contribution of sustainable fisheries (14.7.1). The role of ocean accounts in supporting SDG 14 monitoring is detailed in Section 3.4⁴.

¶4 **Integrated coastal management** connects land-based pressures to marine outcomes through physical supply and use tables, supporting targeting of interventions to reduce nutrient loading, sediment transport, and other coastal impacts. The SEEA Central Framework enables systematic tracking of residual flows from land-based activities to marine receiving environments⁵. By spatially attributing pressures to sources and linking them to changes in ecosystem condition, ocean accounts support the identification of priority actions to reduce negative impacts⁶.

¶5 **Marine Spatial Planning (MSP)** has emerged as a widely adopted framework for organising the spatial allocation of ocean activities. MSP processes typically involve mapping existing uses and conditions, identifying conflicts and compatibilities between different activities, and establishing zones or regulations that govern what activities are permitted in different areas. The effectiveness of MSP depends on the availability of coherent, integrated data that can support analysis of trade-offs and synergies across multiple objectives⁷. Ocean Accounts provide this structured information⁸.

3.2 Sustainability indicators from ocean accounts

¶1 Three categories of sustainability indicators derived from ocean accounts are particularly relevant for sustainable ocean planning:

¶2 **Asset change indicators** track the stocks and changes in stocks of marine natural capital.

These include:

- ¶3 Changes in ecosystem extent (area of different marine and coastal ecosystem types)
- ¶4 Changes in ecosystem condition (physical, chemical, biotic, and landscape characteristics)
- ¶5 Changes in stocks of individual environmental assets (fish biomass, seabed minerals)
- ¶6 Ecosystem degradation (measured as the decline in expected future ecosystem service flows)

¶7 The 2025 SNA establishes that sustainability concerns the maintenance of capital stocks necessary for long-term development, and that depletion of natural resources should be treated as a cost of production⁹. Net Domestic Product (NDP), which deducts both depreciation of produced assets and depletion of natural resources from GDP, is thus conceptually superior to GDP as a measure of economic performance from a sustainability perspective¹⁰. Ocean accounts enable the calculation of ocean-specific contributions to these adjusted aggregates, and the resulting figures indicate whether ocean-based economic activity is maintaining or eroding the natural capital base.

Ecosystem condition accounts: index structure and reference conditions

¶1 For the reference condition options, normalisation formula, and aggregation methods used in ecosystem condition accounts, see **TG-2.1 Aggregate Biophysical Indicators of Environmental State** and **TG-3.1 Asset Accounts** Section 3.4.2.

¶2 **Flow indicators** measure the services provided by marine ecosystems and their relationship to economic activity:

- ¶3 Provisioning services (wild fish biomass harvested, aquaculture production, marine genetic resources)
- ¶4 Regulating services (coastal protection from storms and erosion, carbon sequestration in blue carbon ecosystems, water purification)
- ¶5 Cultural services (marine recreation, coastal tourism, cultural and spiritual values)

¶6 The *SEEA Ecosystem Accounting* framework organises ecosystem services into supply and use tables that record which economic sectors benefit from which ecosystem services, and which ecosystem assets supply those services¹¹.

¶7 **Pressure indicators** measure the impacts of human activities on marine environments:

- ¶8 Residual flows (pollution, marine debris, nutrient loading)
- ¶9 Resource extraction rates relative to regeneration capacity
- ¶10 Physical disturbance to marine habitats
- ¶11 Climate-related pressures (ocean warming, acidification, sea level rise)

¶12 The SEEA Central Framework provides the structure for recording these physical flows between the economy and the environment through Physical Supply and Use Tables (PSUTs)¹². By spatially attributing pressures to sources and linking them to changes in ecosystem condition, ocean accounts support the identification of priority actions to reduce negative impacts.

¶13 The following table summarises how indicators from different account types link across environmental, economic, social, and governance domains, and how each connects to specific SDG 14 targets.

¶14 *Table 3.2.1: Indicator-account linkage across sustainability domains*

Domain	Indicator	Account Source	Measurement	SDG Link
Environmental	Ecosystem extent	Extent accounts	Hectares	14.2, 14.5

Domain	Indicator	Account Source	Measurement	SDG Link
Environmental	Ecosystem condition	Condition accounts	Index (0-1)	14.2
Economic	Ocean GVA	Economic accounts	USD	14.7
Social	Ocean employment	Labour accounts	FTE	14.b
Governance	MPA coverage	Extent accounts (protected area overlay)	% of EEZ	14.5

¶15 For interim MPA coverage calculations, compilers should use UNEP-WCMC/IUCN WDPa data¹³.

Downward connections to accounts and indicators

¶1 Sustainable ocean planning requires specific accounts and indicators to inform decision processes. The following table maps planning use cases to the accounts that should be compiled and the indicators that should be derived:

¶2 *Table 3.2.2: Planning use cases and required accounts*

Planning use case	Required accounts	Key indicators	Informed decisions
Sustainable ocean economy roadmap	Ocean economy accounts (TG-2.5), Asset accounts (TG-3.1)	Ocean GVA, ocean employment, net ocean GVA (adjusted for depletion), fish stock biomass relative to sustainable yield	Setting economic growth targets consistent with natural capital maintenance; identifying sectors for investment and sectors requiring conservation measures
SDG 14 implementation plan	Extent accounts, condition accounts, asset accounts, residual flow accounts	MPA coverage (14.5.1), fish stocks at sustainable levels (14.4.1), coastal eutrophication (14.1.1), ocean economy contribution to GDP (14.7.1)	Tracking SDG 14 progress; identifying data gaps; targeting interventions to accelerate progress
Integrated coastal management	Physical supply-use tables (TG-3.2, TG-3.4), condition accounts, drainage basin allocation	Land-based residual flows to coastal waters (nutrient loading, sediment, pollutants), ecosystem condition by coastal zone	Identifying land-based sources of marine pollution; targeting wastewater treatment, agricultural runoff controls, and sediment retention measures
Marine spatial planning	Extent accounts, condition accounts, economic accounts, ecosystem service accounts	Ecosystem distribution by spatial unit, activity-ecosystem overlap, service flows by providing area	Spatial zoning, conflict resolution, trade-off analysis between conservation and development

¶3 Table 3.2.2 is also the account-prioritisation aid for countries that can compile only one or two account types at first. The planning process that is actually live determines the first-priority account: a fisheries crisis points to asset accounts for aquatic resources, which link directly to stock recovery targets and SDG 14.4; a first SDG 14 Voluntary National Review points to extent and condition accounts, which have the lowest data threshold and map onto indicators 14.5.1 and 14.2; a blue economy strategy points to ocean economy accounts, which establish the baseline any growth target is set against; and a pollution emergency points to residual flow accounts, which trace land-based sources and support intervention targeting.

¶4 Countries with the least capacity should treat extent accounts as the starting point regardless of context. Area data for the major ecosystem types can usually be compiled from existing remote sensing products and protected area registries without primary data collection, and the resulting series supports both SDG 14.5.1 reporting and the spatial baseline that every later account is referenced to. The structured readiness diagnostic in **TG-0.8 Implementation Readiness Assessment** Section 3.2 sets the sequencing in the wider context of a national programme.

3.3 Balancing economic and environmental objectives

¶1 A core function of sustainable ocean planning is to weigh trade-offs between economic objectives and environmental protection. Ocean accounts support that weighing by providing integrated information that allows decision-makers to assess how different choices affect both domains simultaneously. The extended balance sheet approach enables full assessment of ocean wealth. It records both produced assets (ports, vessels, coastal infrastructure) and natural capital (ecosystem assets, fish stocks, seabed resources) within a consistent valuation framework. As the 2025 SNA establishes, natural capital comprises natural resources (recognised within the integrated framework of national accounts) and ecosystem assets (measured through SEEA Ecosystem Accounting)¹⁴. Changes in this extended balance sheet indicate whether development is increasing overall wealth, converting natural capital into produced capital, or depleting natural capital without corresponding gains.

¶2 The ecosystem degradation concept provides a monetary measure of the cost of environmental decline. Degradation is defined as the decline in the expected future ecosystem service flows attributable to human activity during an accounting period¹⁵. By measuring degradation in monetary terms consistent with national accounts, planners can assess the full costs of development pathways that damage marine ecosystems.

¶3 Degradation is calculated as the condition decline multiplied by the present value of the affected service flows, with the applicability conditions and discount-rate treatment specified in **TG-3.1 Asset Accounts** Section 3.5.3. For planning purposes the significance is that degradation is a cost, denominated in the same units as the development benefits it is weighed against, and that it is currently omitted from most national accounts – so a development pathway that looks positive on conventional measures may not be once it is included.

¶4 Practical application of this balancing function involves several steps, summarised in Table 3.3.0 below.

¶5 **Table 3.3.0: Steps in applying ocean accounts to balance economic and environmental objectives**

Step	Description
Baseline assessment	Establish current stocks of ocean assets (ecosystem extent and condition, individual environmental assets, produced assets) and current flows (ecosystem services, economic production, residual flows).
Scenario development	Define alternative planning scenarios representing different combinations of economic development and conservation measures.
Impact assessment	For each scenario, project changes in asset stocks and service flows using accounting relationships and appropriate models.
Trade-off analysis	Compare scenarios in terms of their effects on multiple indicators spanning economic, environmental, and social dimensions.
Stakeholder deliberation	Present trade-off information in accessible formats to support informed decision-making by relevant stakeholders.

¶6 The accounting framework ensures that these assessments maintain internal consistency. As all components are linked through supply-use relationships and stock-flow identities, changes pro-

jected for one component must be reconciled with changes in related components. This discipline prevents the optimistic assumptions that can otherwise undermine planning processes.

Dashboard approach for ocean sustainability monitoring

¶1 The ocean sustainability dashboard presents integrated sustainability information as a set of headline indicators spanning economic, environmental, and social dimensions, tracked over time and compared against targets. Table 3.3.1 presents an illustrative dashboard structure populated with synthetic data.

¶2 *Table 3.3.1: Ocean sustainability dashboard (Country A, illustrative)*

Dimension	Indicator	Current value	5-year target	Status	Account source
Economic	Ocean GVA (% of GDP)	3.5%	4.0%	On track	Ocean economy accounts
	Net ocean GVA (adjusted for depletion)	3.3% of GDP	3.8% of GDP	Below target	Asset accounts + economy accounts
	Ocean employment (thousand FTE)	250	280	On track	Labour accounts
Environmental	Fish stocks at sustainable levels (% of assessed stocks)	68%	80%	Below target	Asset accounts (aquatic resources)
	Coral reef condition index (0-1)	0.62	0.70	Below target	Condition accounts
	Mangrove extent (km ²)	497	550	Below target	Extent accounts
	Marine protected area coverage (% of EEZ)	18%	30%	On track	Extent accounts (protected area overlay)
Social	Ocean employment share female (%)	38%	45%	On track	Labour accounts
	Coastal communities with livelihood dependency >50% (count)	127	100	Action needed	Household survey / labour accounts disaggregated by coastal zone ¹⁶
Pollution	Coastal eutrophication (nitrogen loading, tonnes/yr)	8,500	6,000	Below target	Residual flow accounts
	Marine plastic debris density (g/km ²)	142	100	Below target	Residual flow accounts

¶3 Figure 1.4.1 presents this dashboard as an interactive view for senior decision-makers. The summary cards report how many indicators sit in each status band. The controls let users filter by status or re-rank indicators by the size of their gap to target, whilst hovering any row reveals the underlying values. The contrast between on-track economic indicators and lagging environmental and pollution indicators is apparent.



Figure 1.4.1 Static snapshot of the ocean sustainability dashboard (Country A, illustrative).

¶4 The dashboard indicates that whilst economic indicators are on track to meet targets, environmental and pollution indicators are lagging. This pattern suggests that economic growth is occurring at the expense of natural capital depletion, a finding confirmed by the gap between gross ocean GVA (3.5%) and net ocean GVA adjusted for depletion (3.3%). The dashboard structure enables presentation to cabinet-level decision-makers and supports integrated policy responses that address economic, environmental, and social dimensions simultaneously. This approach draws on the combined presentation principles described in **TG-3.8 Combined Presentations**, which provides detailed guidance on assembling multi-dimensional indicator sets from ocean accounts.

3.4 Integration with SDG monitoring

¶1 SDG 14 (“Conserve and sustainably use the oceans, seas and marine resources for sustainable development”) establishes a global framework for ocean sustainability with specific targets and indicators¹⁷. Ocean accounts provide a structured basis for producing many of these indicators and for understanding the relationships between them.

¶2 Key SDG 14 targets and their connection to ocean accounts include:

Target	Description	Ocean Account Connection
14.1	Reduce marine pollution	Residual flow accounts, ecosystem condition indicators
14.2	Sustainably manage marine ecosystems	Ecosystem extent and condition accounts, ecosystem services accounts
14.4	End overfishing, restore fish stocks	Asset accounts for aquatic resources, depletion calculations
14.5	Conserve coastal and marine areas	Ecosystem extent accounts (protected area overlay)
14.7	Increase economic benefits to SIDS and LDCs	Ocean economy thematic accounts, ecosystem services valuation

SDG 14 monitoring and ocean accounts

¶1 Sustainable Development Goal 14 encompasses ten targets and eleven indicators covering marine pollution, ecosystem management, ocean acidification, fisheries sustainability, marine protected areas, small-scale fisheries, marine research, and UNCLOS implementation¹⁸. As of 2024, all SDG 14 indicators have an established methodology (Tier I or II), although data coverage remains uneven across regions and indicators¹⁹. Data gaps persist, particularly for small island developing states and developing countries, and for targets relating to marine pollution (SDG 14.1), subsidies (SDG 14.6), and economic benefits to SIDS and LDCs (SDG 14.7)²⁰.

¶2 Ocean accounts provide a systematic framework for generating data that supports SDG 14 monitoring. Physical extent accounts map directly to indicator 14.5.1 (marine protected area coverage). Asset accounts for fish stocks support indicator 14.4.1 (proportion of fish stocks within biologically sustainable levels). Flow accounts for residuals support indicator 14.1.1 (coastal eutrophication and floating plastic debris density). Economic accounts enable assessment of the economic contribution of sustainable fisheries (14.7.1). The accounting approach provides an integrated information system from which a range of indicators can be drawn, in place of bespoke data collection for each indicator in isolation.

¶3 The Kunming-Montreal Global Biodiversity Framework (GBF), adopted in December 2022, establishes complementary targets relevant to ocean accounting, including Target 3 (30% of marine areas effectively conserved by 2030), Target 5 (sustainable harvesting of wild species), and Target 10 (sustainable management of areas under agriculture, aquaculture, and forestry)²¹. Ocean accounts can generate indicators aligned with both SDG 14 and GBF targets, and the shared 'data foundations' required for monitoring both frameworks reinforce the case for investment in ocean accounting.

¶4 Beyond SDG 14, ocean accounts support monitoring of other SDGs that intersect with ocean sustainability. SDG 2 (Zero Hunger) targets benefit from accounts that track fish provisioning and aquaculture production. SDG 8 (Decent Work and Economic Growth) targets can draw on ocean economy thematic accounts that measure employment and value added in ocean sectors. SDG 13 (Climate Action) targets connect to accounts measuring blue carbon stocks and sequestration services²².

¶5 National ocean accounts provide the macro-level reference data against which corporate biodiversity disclosures can be benchmarked. Guidance on aligning ocean accounts with private sector reporting frameworks (including GBF Target 15 and the Taskforce on Nature-related Financial Disclosures) is set out in **TG-1.11 OA and the Private Sector** Section 3.3.

3.5 Planning frameworks and ocean accounts

¶1 Sustainable ocean planning is not a single process. Ocean accounts feed several established planning frameworks, each of which is treated in its own circular. Table 3.5.1 routes to them, and states what each framework takes from the accounts.

¶2 *Table 3.5.1: Planning frameworks, the accounts they draw on, and where each is treated*

Planning framework	What it takes from the accounts	Treated in
Marine spatial planning	Ecosystem extent and condition by spatial unit; the spatial footprint and intensity of activities; service flows by providing and benefiting area; pressure sources and pathways	TG-1.2 OA and Marine Spatial Planning
Marine spatial management and MPAs	Extent and condition baselines for designation; time-series condition for effectiveness; service flows for economic impact of restrictions	TG-1.3 OA and Marine Spatial Management

Planning framework	What it takes from the accounts	Treated in
Integrated coastal management	Terrestrial-to-marine attribution of residual loads; dependence of coastal condition on upstream pressure; coastal protection service supply	TG-3.4 Section 3.5 for the attribution method; this Circular Section 3.2 for the indicators
Fisheries management	Stock biomass against reference points; catch against sustainable yield; depletion; sector economic structure	TG-1.5 OA and Fisheries Management
Blue economy strategy	Ocean GVA, employment and trade; sector dependence on ecosystem services; whether the growth path maintains or erodes natural capital	TG-2.5 Structure and Function of the Ocean Economy ; TG-1.10 for the planning-cycle integration
Climate adaptation planning	Blue carbon stocks and sequestration; condition indicators sensitive to climate drivers; coastal protection service at risk; exposed areas and populations	TG-2.8 Climate Change Indicators ; TG-2.9 Disaster Risk Indicators

¶3 The value of the accounting framework across these frameworks is that they draw on one coherent evidence base rather than several incompatible ones. A country running marine spatial planning, a blue economy strategy and an adaptation plan concurrently will otherwise generate three different figures for the extent of its mangroves, and the inconsistency will be discovered in public.

3.6 Worked example: Ocean sustainability dashboard

¶1 To demonstrate the practical application of ocean accounts to sustainable ocean planning, this section presents a synthetic worked example showing how account-derived indicators populate an ocean sustainability dashboard for decision-makers. The example uses hypothetical data for a medium-sized coastal state developing a five-year sustainable ocean economy roadmap.

Scenario

¶1 Country B is a middle-income coastal state with an ocean economy contributing 4.2% of GDP and employing 380,000 people. The government is developing a sustainable ocean economy roadmap for 2025–2030 that aims to increase the ocean economy's GDP contribution to 5.5% whilst ensuring fish stocks are rebuilt to sustainable levels and coastal ecosystems are protected. The Ministry of Finance requires quantified evidence that the proposed roadmap maintains natural capital and does not rely on unsustainable resource depletion.

Account compilation

¶1 The National Statistics Office compiled the accounts summarised in Table 3.6.0 below for base-line year 2024. The asset account for aquatic resources records opening biomass of 156,000 tonnes, natural growth of 41,000 tonnes, natural mortality of 13,000 tonnes, net natural change of 28,000 tonnes, actual catch of 32,000 tonnes/yr, and closing stock of 152,000 tonnes. Sustainable yield is 28,000 tonnes/yr (equal to net natural change), implying depletion of 4,000 tonnes/yr.

¶2 **Table 3.6.0: Baseline accounts compiled for Country B (2024)**

Account	Baseline values
Ocean economy thematic accounts (TG-2.5)	Ocean GVA = USD 2,100 million (4.2% of GDP); employment = 380,000 FTE.

Account	Baseline values
Asset accounts for aquatic resources (TG-3.1)	Closing stock = 152,000 tonnes; catch = 32,000 tonnes/yr; sustainable yield = 28,000 tonnes/yr; depletion = 4,000 tonnes/yr.
Ecosystem extent accounts	Mangroves = 1,240 km ² ; seagrass = 890 km ² ; coral reefs = 620 km ² .
Ecosystem condition accounts	Mangrove condition index = 0.68; seagrass condition index = 0.71; coral reef condition index = 0.58 (all relative to reference condition = 1.0).
Residual flow accounts (TG-3.4)	Nitrogen loading to coastal waters = 12,400 tonnes/yr; plastic debris flux = 3,200 tonnes/yr.

Indicator derivation

¶1 From these accounts, the following sustainability indicators were derived for the dashboard:

¶2 *Table 3.6.1: Baseline sustainability indicators for Country B (2024)*

Dimension	Indicator	Value	Account source
Economic	Ocean GVA (% of GDP)	4.2%	Ocean economy accounts
	Gross ocean GVA (USD million)	2,100	Ocean economy accounts
	Depletion (fish stocks, USD million)	12	Asset accounts (depletion valued at resource rent) ²³
	Net ocean GVA (USD million)	2,088	Economy accounts minus asset depletion
	Net ocean GVA (% of GDP)	4.18%	Adjusted measure
	Ocean employment (thousand FTE)	380	Labour accounts
Environmental	Fish stock biomass (% of MSY level)	78%	Asset accounts (closing stock 152,000 t ÷ MSY biomass target 195,000 t) ²⁴
	Fish stocks at sustainable levels	No (catch 32,000 t > sustainable yield 28,000 t)	Asset accounts
	Mangrove extent (km ²)	1,240	Extent accounts
	Mangrove condition index	0.68	Condition accounts
	Coral reef condition index	0.58	Condition accounts
Pollution	Nitrogen loading (tonnes/yr)	12,400	Residual flow accounts
	Marine plastic debris (tonnes/yr)	3,200	Residual flow accounts

Scenario projections

¶1 The sustainable ocean economy roadmap proposes three intervention packages, each with projected effects on economic and environmental indicators. The projections use the accounting identities to ensure internal consistency: changes in fish stock biomass are reconciled with extraction and growth rates, changes in ecosystem extent affect service flows, and changes in condition affect service capacity.

¶2 *Table 3.6.2: Scenario projections for 2030 target year*

Indicator	Baseline 2024	Scenario A: Business as usual	Scenario B: Moderate intervention	Scenario C: Strong conservation	2030 Target
Ocean GVA (% of GDP)	4.2%	4.8%	5.2%	5.0%	5.5%
Net ocean GVA (% of GDP)	4.18%	4.3%	5.0%	4.9%	5.3%
Fish stock biomass (tonnes)	152,000	121,000	152,000	210,000	195,000
Catch (tonnes/yr)	32,000	34,000	28,000	28,000	≤28,000
Depletion (tonnes/yr)	4,000	6,000	0	0	0
Mangrove extent (km ²)	1,240	1,190	1,280	1,320	1,350
Coral condition index	0.58	0.52	0.63	0.68	0.70
Nitrogen loading (tonnes/yr)	12,400	13,800	10,200	8,500	9,000

¶3 **Scenario A (Business as usual):** Continuation of current policies results in increased ocean GVA but continued depletion of fish stocks (depletion rising to 6,000 tonnes/yr), declining mangrove extent (–50 km²), and worsening coral condition. Net ocean GVA grows more slowly than gross GVA due to increased depletion costs. That widening gap indicates unsustainable resource use.

¶4 **Scenario B (Moderate intervention):** Implementation of catch limits at sustainable yield (28,000 tonnes/yr), mangrove restoration (+40 km²), and wastewater treatment upgrades reducing nitrogen loading by 18%. Ocean GVA reaches 5.2% of GDP, depletion stops, and net ocean GVA growth matches gross growth. Holding catch at sustainable yield stabilises the stock at 152,000 tonnes rather than rebuilding it (TG-1.5 Table 3.4.1), so the “fish stocks at sustainable levels” indicator is not achieved by 2030: catch is at sustainable yield, but the stock stays at 78% of the MSY biomass target²⁵. Rebuilding to 195,000 tonnes by 2030 would require catch held below sustainable yield, at about 20,800 tonnes/yr on the account’s own flows.²⁶

¶5 ⓘ **Corrected 24 September 2026**

¶6 Scenario B previously showed catch at sustainable yield rebuilding the stock to 195,000 tonnes; on the account’s own stock identity it holds the stock at 152,000 tonnes, so the projection, the 2024 opening stock and natural growth, the Scenario A biomass and the dashboard status have been corrected to match.

¶7 **Scenario C (Strong conservation):** More aggressive interventions including marine protected area expansion, larger restoration programmes, and stronger pollution controls. Environmental indicators exceed targets (fish stock biomass reaches 210,000 tonnes, above the 195,000 t MSY target), but ocean GVA growth is slightly constrained (5.0% vs 5.5% target) due to spatial allocation of 15% of fishing grounds to no-take MPAs. The stock recovery in Scenario C reflects enhanced recruitment from no-take zones and reduced bycatch mortality, projected using a spatial population model.

***Note on scenario modelling levels:** The accounting-based scenario projections in Scenarios A and B can be implemented using stock identity accounting – opening stock + net natural change – catch = closing stock – and do not require specialist fisheries modelling. The spatial population model referenced in Scenario C requires collaboration with fisheries scientists and is presented for completeness, not as a minimum requirement for compilers. For practitioners who wish to pursue Scenario C-level analysis, see FAO (1999) Guidelines for the routine collection of capture fishery data²⁷ and ICES (2021) stock assessment guidance²⁸.*

Dashboard presentation

¶1 The scenario analysis was presented to cabinet in Table 3.6.3, showing the trade-offs between economic growth and environmental outcomes:

¶2 Table 3.6.3: Sustainable ocean economy roadmap dashboard (Country B)

Indicator	2024 Baseline	2030 Target	Scenario B projection	Status
Economic outcomes				
Ocean GVA (% of GDP)	4.2%	5.5%	5.2%	Near target
Net ocean GVA (% of GDP)	4.18%	5.3%	5.0%	Near target
Ocean employment (thousand FTE)	380	450	440	On track
Environmental outcomes				
Fish stocks at sustainable levels	No	Yes	No	Below target
Fish stock biomass (tonnes)	152,000	195,000	152,000	Below target
Mangrove extent (km²)	1,240	1,350	1,280	On track
Coral condition index	0.58	0.70	0.63	On track
Pollution reduction				
Nitrogen loading (tonnes/yr)	12,400	9,000	10,200	On track
Plastic debris (tonnes/yr)	3,200	2,000	2,400	On track

Policy implications

¶1 The analysis demonstrated that:

1. ¶2

Gross GVA overstates sustainability: The gap between gross and net ocean GVA (4.2% vs 4.18% in 2024, widening to 4.8% vs 4.3% under business-as-usual in 2030) reveals that current growth relies on natural capital depletion. This finding, grounded in the 2025 SNA treatment of depletion as a production cost, indicated to the finance ministry that current policies risk unsustainability.

2. ¶3

Catch at sustainable yield halts depletion; rebuilding needs catch below it: Scenario B shows that reducing catch to sustainable yield (28,000 tonnes/yr) stops the depletion recorded in as-set accounts and eliminates the NDP adjustment, but holds the stock at 152,000 tonnes. Recovering to the MSY biomass target of 195,000 tonnes over six years requires catch of about 20,800 tonnes/yr, below sustainable yield, until the stock has rebuilt. The stock identity makes the size of that trade-off visible before a target is set.

3. ¶4

Restoration investments yield long-term returns: The mangrove restoration component of Scenario B (+40 km² by 2030) costs an estimated USD 15 million over six years but generates coastal protection services valued at USD 480,000/yr (replacement cost basis) and carbon sequestration services valued at USD 160,000/yr. Together, these annual service flows total USD 640,000. The undiscounted breakeven point is approximately year 23 ($\text{USD } 15,000,000 \div \text{USD } 640,000/\text{yr} \approx 23.4$ years). Practitioners should apply their country's social discount rate when replicating this analysis. Blue carbon values may increase as carbon prices rise, and any such increase would strengthen the net benefits case over time²⁹. These service flows are recorded in ecosystem service accounts (TG-3.2).

4. ¶5

Pollution controls support ecosystem recovery: The 18% reduction in nitrogen loading under Scenario B (from 12,400 to 10,200 tonnes/yr), achieved through wastewater treatment upgrades costing USD 22 million, improves water quality sufficiently to support coral and seagrass condition improvement. The condition improvements are projected to increase ecosystem service capacity by 8%. That capacity gain yields fishery nursery benefits that partially offset the costs of pollution controls.

¶6 Based on this analysis, the cabinet approved Scenario B as the basis for the sustainable ocean economy roadmap, with specific budget allocations for catch management enforcement, man-grove restoration, and wastewater infrastructure documented in the national budget presentation (**TG-1.1 OA and National Budget Processes**).

4. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

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3. ¶23 Depletion valued at illustrative resource rent of USD 3,000/tonne for a mixed demersal/pelagic fishery (4,000 t × USD 3,000/t = USD 12 million). The resource rent is derived from an assumed ex-vessel price of approximately USD 4,500/t and a fishing cost ratio of ~33%, yielding a rent margin of ~USD 3,000/t. The species mix is illustrative of a mid-value mixed fishery. Compilers should derive resource rent from national fisheries price and cost data. See SEEA CF Section 5.9.3 for the resource rent valuation method and **TG-3.1 Asset Accounts** and **TG-1.1 OA and National Budget Processes** for detailed methodology. This figure is illustrative only.
4. ¶24 Sustainability percentage = closing stock (152,000 t) ÷ MSY biomass target (195,000 t). Closing-stock convention is applied consistently in Table 3.6.2. The MSY biomass target of 195,000 t is an illustrative value consistent with the Schaefer model relationship $B_{MSY} \approx K/2$, where K (carrying capacity) is estimated at approximately 390,000 t based on the stock's historical abundance data in this synthetic example.
5. ¶25 "Fish stocks at sustainable levels" is triggered by the stock reaching or exceeding the MSY biomass target. Under Scenario B, catch at sustainable yield holds the stock at 152,000 t, so the criterion is not met by 2030. See

FAO (2005) *Reference points for fisheries management* for the biological rationale for using B_{MSY} as a sustainability threshold.

6. ¶26 **Scenario A and B stock projections.** Both apply the stock identity (opening stock + net natural change – catch = closing stock) with net natural change held at its 2024 value of 28,000 t/yr, which equals sustainable yield. Under Scenario A, catch rises linearly from 32,000 t to 34,000 t by 2030, so cumulative depletion over 2025–2030 is 31,000 t and the stock falls to about 121,000 t. Under Scenario B, catch equals sustainable yield and the stock holds at 152,000 t. Reaching 195,000 t by 2030 needs an average net addition of about 7,200 t/yr (43,000 t over six years), so catch of about 20,800 t/yr. A surplus production model does not change this materially: on a Schaefer curve with carrying capacity of about 390,000 t (footnote 24), surplus production at 152,000 t (78% of B_{MSY}) is already about 95% of its maximum and can rise by only about 5% as the stock rebuilds, so catch at the current sustainable yield leaves the stock close to where it is. See FAO (2005) *Reference points for fisheries management* for the biological rationale.
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DRAFT

OA and Fisheries Management

Provides guidance on using Ocean Accounts to inform fisheries management decisions.

Version 0.8.2 **Status** Draft **Stability** Applied

Last updated September 2026 **Responsible officer** Dr Jordan Gacutan

Drafting AI-assisted drafting from GOAP Secretariat source materials; source list to be published at the close of consultation.

OUTCOME

This Circular sets out how Ocean Accounts inform fisheries management decisions: which account entries and indicators bear on a quota decision, how to read them, and what the data behind them will and will not support. Compilation of the aquatic resource accounts is treated in [TG-3.1 Asset Accounts](#) and [TG-6.7 Fisheries Accounting: Integrating Stock Assessment](#), and the data sources in Section 4, to which this Circular refers rather than restating.

Decision use cases. Four management functions are supported. Quota setting compares total removals against sustainable yield at current biomass, and stock biomass against B_{MSY}, to establish whether depletion is occurring and what TAC response follows; the decision framework is Table 3.4.1 and is worked through in Section 3.4.2. MSY verification tests whether a management plan is achieving its stated objective of maintaining stocks at levels capable of producing maximum sustainable yield. Subsidy reform links government support to stock status, revealing whether support is contributing to overcapacity, in line with SDG 14.6. SDG 14.4.1 reporting draws directly on the asset accounts for the proportion of stocks within biologically sustainable levels.

What a manager needs to know about the accounts. Section 3.1 sets out four points that determine how the numbers should be read: wild capture and aquaculture are different assets accounted differently; natural mortality is not depletion; the stock assessment data tier limits what the accounts can support, so that at the lowest tier they give a direction of travel and not an absolute biomass; and shared stocks are attributed rather than observed. Section 3.5 adds the two source limitations that most often change a conclusion – unestimated IUU catch, and uncounted subsistence and recreational removals – both of which make a depletion figure a lower bound.

These use cases connect to the fiscal framing in [TG-1.1 OA and National Budget Processes](#), where fisheries depletion enters natural capital budgeting.

CONTENTS

1. Outcome 3

2. Requirements 3

3. Guidance Material 3

 3.1 How the fishery enters the accounts 3

 3.2 Economic performance indicators 4

 3.3 Sustainability Indicators 5

 3.4 Practical Applications 6

 3.5 Where the data come from, and what that means for a decision 12

4. Acknowledgements 12

5. References 12

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DRAFT

1. Outcome

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¶2 **Decision use cases.** Four management functions are supported. **Quota setting** compares total removals against sustainable yield at current biomass, and stock biomass against B_{MSY} , to establish whether depletion is occurring and what TAC response follows; the decision framework is Table 3.4.1 and is worked through in Section 3.4.2. **MSY verification** tests whether a management plan is achieving its stated objective of maintaining stocks at levels capable of producing maximum sustainable yield. **Subsidy reform** links government support to stock status, revealing whether support is contributing to overcapacity, in line with SDG 14.6. **SDG 14.4.1 reporting** draws directly on the asset accounts for the proportion of stocks within biologically sustainable levels.

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¶4 These use cases connect to the fiscal framing in **TG-1.1 OA and National Budget Processes**, where fisheries depletion enters natural capital budgeting.

2. Requirements

• ¶1 **TG-0.1 General Introduction**

¶2 **Related Circulars:**

- ¶3 **TG-3.1 Asset Accounts** – General methodology for physical and monetary asset accounts
- ¶4 **TG-3.2 Flows from Environment to Economy** – Treatment of fish harvest as natural resource input
- ¶5 **TG-3.9 Aquaculture** – Distinguishing cultivated from natural aquatic resources
- ¶6 **TG-6.7 Fisheries Accounting: Integrating Stock Assessment** – Detailed thematic methodology for linking stock assessment to accounts

¶7 Readers approaching Section 1 for the first time should begin with **TG-1.0 Ocean Accounting and the Blue/Ocean Economy**, the framing circular for the section, which sets out the ocean economy terminology used throughout, what an ocean account can and cannot certify about a blue economy claim, and the map from a policy question to the circular that answers it. It is recommended reading, not a prerequisite.

3. Guidance Material

3.1 How the fishery enters the accounts

¶1 A fisheries manager does not compile the aquatic resource accounts, but needs to know enough about their construction to interpret and defend the numbers they produce. Four points carry most

of that weight; each is specified in full elsewhere.

¶2 **Wild capture and aquaculture are different assets, accounted differently.** Natural aquatic resources – wild stocks whose growth and regeneration occur without direct management – are non-produced biological assets outside the SNA production boundary until harvest, and are therefore subject to depletion accounting when extraction exceeds sustainable yield. Cultivated resources in aquaculture facilities are inside the production boundary and are not. The classification is set out in **TG-3.1 Asset Accounts** Section 3.4.1, with aquaculture in **TG-3.9**. A manager arguing that a fishery is being drawn down is making a claim about the first category only.

¶3 **The physical asset account separates extraction from everything else.** Opening stock, natural growth, gross catch, natural mortality, other volume changes and closing stock are recorded separately (TG-3.1 Section 3.4.1). Only extraction flows enter the depletion test: **natural mortality is not depletion**, however large. Confusing the two is the most common error in reading a fisheries asset account, and it materially overstates the case for intervention.

¶4 **Stock assessment supplies the account entries, and its data tier limits what can be said.** The correspondence between assessment outputs and account entries – biomass to opening and closing stock, recruitment to natural growth, natural mortality to normal losses, fishing mortality to extraction, MSY to sustainable yield, retrospective revisions to reappraisals – is set out in **TG-6.7 Fisheries Accounting: Integrating Stock Assessment** Sections 3.1 to 3.3, together with the tiered approach for countries without full age-structured assessments. The practical consequence for management is in Section 3.4.1 below: at the lowest data tier the accounts support a direction of travel but not an absolute biomass, and a quota decision has to be framed accordingly.

¶5 **Shared stocks are attributed, not observed.** Where a stock migrates in and out of the EEZ, biomass is attributed on the country's agreed RFMO allocation share, or in its absence on the estimated stock fraction present at a mid-year survey date, with the method documented and the double-counting risk flagged (TG-3.1 Section 3.4.1; **TG-4.12 Transboundary Data Sharing**). RFMO assessment outputs – WCPFC, IOTC, CCSBT in the Asia-Pacific – are the primary input where domestic assessments do not exist. A national quota argument that rests on an attributed share is only as strong as the allocation agreement behind it.

¶6 Species are classified using FAO ASFIS and ISCAAP (TG-3.1 Section 3.4.1; **TG-4.10 Extending Fisheries Statistics**), which is what makes national accounts comparable with FAO series and with neighbouring states.

3.2 Economic performance indicators

¶1 The economic indicators for the fisheries sector – gross output, intermediate consumption, gross value added, net value added after depreciation and depletion, employment, compensation of employees, and trade in fishery products – are defined and compiled under **TG-2.5 Structure and Function of the Ocean Economy** and **TG-3.3 Economic Activity Relevant to the Ocean**. Three fisheries-specific points determine whether those indicators answer a management question.

¶2 **Disaggregation is what makes them useful.** A single sector GVA figure supports almost no management decision. The disaggregations that do are: by type of fishing (commercial, artisanal and small-scale, recreational, subsistence); by gear type; by target species or stock; by fishing ground; and by enterprise size. A management measure almost always falls on one of these groups and not the others, and the distributional consequence is the question a minister will ask.

¶3 **Small-scale fisheries are systematically undercounted.** Small-scale operations employ an estimated 90 per cent of the world's capture fishers and fish workers, yet are routinely missed by labour force surveys because the work is informal, seasonal or part-time.¹ Where the accounts are compiled from standard surveys alone, the employment figure will understate the sector, and it will understate it precisely in the group most exposed to a quota reduction. Coverage methods – fisheries modules in household surveys, landing-site frame surveys, key-informant validation, and proxy

estimation from vessel registries – are set out in **TG-4.2 Survey Methods** and **TG-4.10**. A manager should establish which were used before citing an employment number in a distributional argument.

¶4 **National resource and national fleet are different questions.** Catches from national aquatic resources regardless of who takes them, and catches by national fishing operations regardless of where they fish, are distinct measures. The first tracks the national asset; the second tracks the national industry. Stock rebuilding arguments turn on the first, industry adjustment arguments on the second, and conflating them produces a case that does not hold.

3.3 Sustainability Indicators

3.3.1 Stock Status Indicators

¶1 Physical asset accounts provide the foundation for key stock status indicators:

¶2 **Stock biomass relative to reference points:** Comparing current estimated biomass (B) to biological reference points such as:

- ¶3 B_{MSY}: Biomass at which MSY is achieved
- ¶4 B₀: Unfished (virgin) biomass
- ¶5 B_{lim}: Limit reference point below which recruitment is impaired

¶6 **Fishing mortality relative to reference points:** Comparing current fishing mortality rate (F) to:

- ¶7 F_{MSY}: Fishing mortality that produces MSY
- ¶8 F_{0.1}: Precautionary proxy for F_{MSY}
- ¶9 F_{lim}: Limit above which stock decline is expected

¶10 **Proportion of stocks within biologically sustainable levels:** SDG indicator 14.4.1 measures the percentage of fish stocks that are within biologically sustainable levels, defined as stocks with abundance at or above the level that can produce MSY².

3.3.2 Depletion-Adjusted Income Measures

¶1 The 2025 SNA now treats depletion of natural resources as a cost of production alongside depreciation, which gives greater prominence to net income measures that account for the using up of natural capital (SNA 2025 Annex 4, para A4.59)³. Countries that have not yet transitioned to SNA 2025 can compile depletion-adjusted income measures as supplementary or satellite account entries consistent with SNA 2008. The SEEA Central Framework provides a version-neutral basis for these calculations (SEEA CF Section 5.8). That basis allows countries at any stage of SNA transition to produce depletion-adjusted indicators. For fisheries, this means:

¶2 **Net fishing income:** Gross value added from fishing less the value of depletion. This measure reflects the genuine contribution of fisheries to national income after accounting for any reduction in the fish stock asset.

¶3 **Sustainable net income:** Income that could be earned indefinitely if harvesting were limited to sustainable yield levels. Operationally, sustainable net income can be approximated as: $SNI = GVA \times (SY / \text{gross catch})$, where SY is the sustainable yield at current biomass and gross catch is actual extraction for the period. This scaling approach assumes that costs and revenues are proportional to catch volume. Where unit cost data are available, a more precise formulation is: $SNI = SY \times (\text{average price per tonne} - \text{average cost per tonne})$. For a numerical illustration, see the companion monetary example in Step 1b of Section 3.4.2. More detailed methodology, including treatment of multi-species fisheries and long-run price assumptions, is covered in **TG-6.7 Fisheries Accounting: Integrating Stock Assessment**.

¶4 When depletion occurs (extraction exceeds sustainable yield), the difference between gross income and sustainable net income represents income generated by depleting capital rather than genuine sustainable returns.

3.3.3 SDG 14 Alignment

¶1 Ocean Accounts support monitoring of several SDG 14 targets related to fisheries⁴:

¶2 **SDG 14.4:** “By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics.”⁵

- ¶3 Indicator 14.4.1: Proportion of fish stocks within biologically sustainable levels
- ¶4 Asset accounts directly provide data on stock status relative to MSY benchmarks. SDG 14.4.1 uses an unweighted stock-count method: each assessed stock is counted equally, and the indicator equals the number of stocks at or above B_{MSY} divided by the total number of assessed stocks. Where a country's fisheries data are already disaggregated by species or stock in pre-existing fisheries data systems, those disaggregated stock records feed directly into the count without further aggregation. Compilers should follow FAO's indicator methodology note (FAO 2020, footnote 34) for official SDG reporting. Alternative weightings by catch volume or landed value may be informative for national monitoring purposes but should not replace the FAO un-weighted method for official SDG submissions.

¶5 **SDG 14.6:** “By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies.”

- ¶6 Environmental subsidy accounts can track government support to the fisheries sector
- ¶7 Analysis can assess whether subsidies enhance or undermine sustainability

¶8 **SDG 14.7:** “By 2030, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism.”

- ¶9 Indicator 14.7.1: Sustainable fisheries as a proportion of GDP in small island developing States, least developed countries and all countries
- ¶10 Directly derived from economic accounts measuring fisheries GVA

¶11 **SDG 14.b:** “Provide access for small-scale artisanal fishers to marine resources and markets.”

- ¶12 Indicator 14.b.1: Degree of application of a legal/regulatory/policy/institutional framework which recognizes and protects access rights for small-scale fisheries
- ¶13 Disaggregated accounts can track the distribution of fisheries benefits across scales of operation

3.4 Practical Applications

3.4.1 Informing Total Allowable Catch Decisions

¶1 Fisheries managers commonly set Total Allowable Catch (TAC) limits based on biological stock assessments. Ocean Accounts enhance this process by:

- ¶2 Providing a systematic framework for recording and updating stock information
- ¶3 Enabling comparison of catch levels against sustainable yield benchmarks
- ¶4 Tracking the cumulative impact of harvesting decisions on stock levels over time
- ¶5 Integrating economic information to assess the costs and benefits of different TAC options⁶

¶6 The following decision framework illustrates how data from physical asset accounts and stock assessments can be combined to guide TAC decisions. By cross-referencing the current stock status (expressed as the ratio of biomass to the biomass at maximum sustainable yield, B/B_{MSY}) with recorded catch relative to sustainable yield (SY), managers can identify the appropriate management response. Figure 1.5.1 presents this as a two-by-two matrix. Each combination of stock status

and catch level maps to one of four management outcomes and routes to its corresponding physical- and monetary-asset account entries.

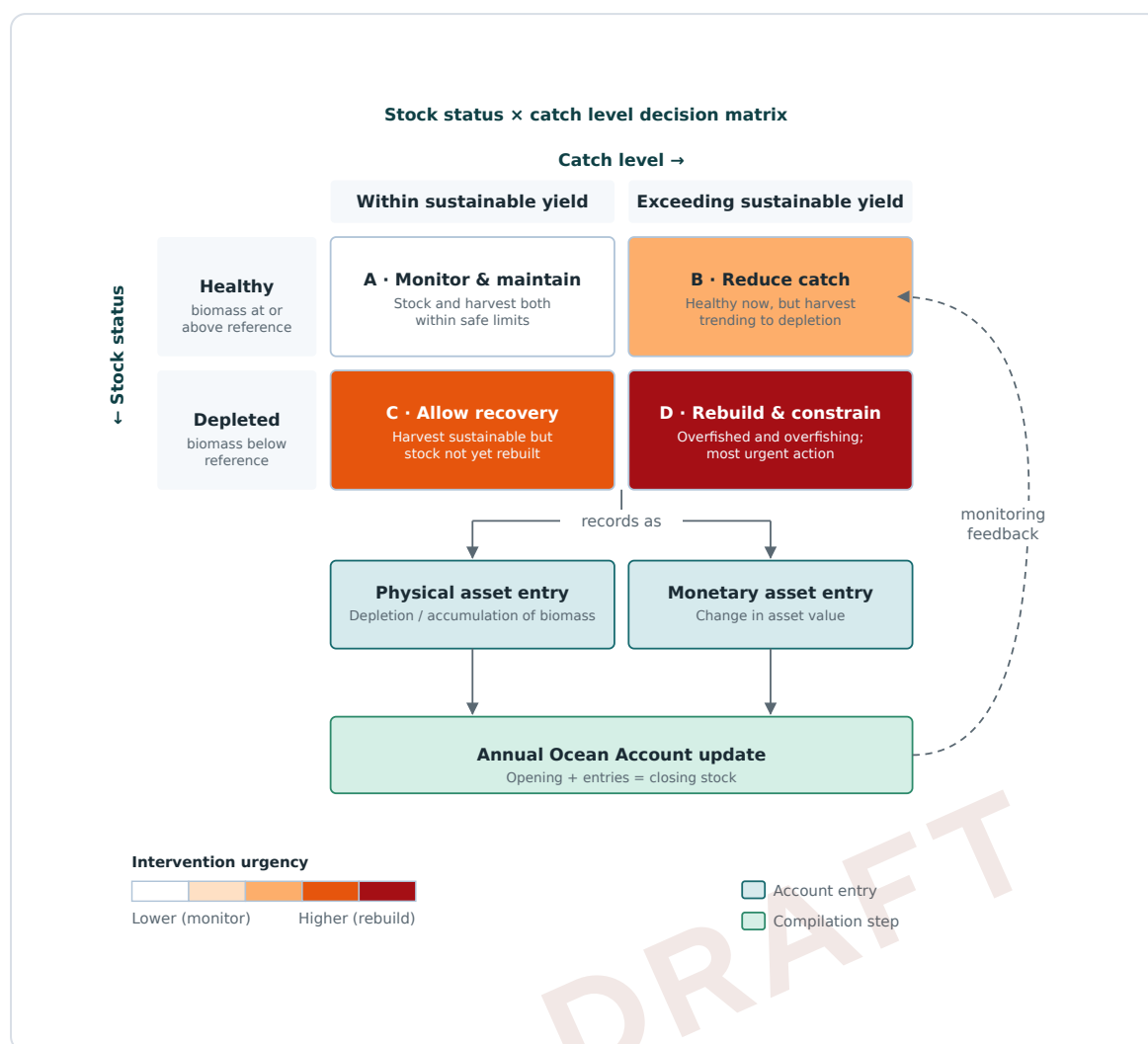


Figure 1.5.1 Stock status crossed with catch relative to sustainable yield yields four management outcomes linked to physical and monetary asset entries. [a] Cell shade = intervention urgency (ordinal, not quantitative). [b] Dashed edge = monitoring feedback.

Source: TG-1.5 draft v6, Section 3.5, Table 3.5.1 (four-outcome stock × catch matrix).

Adapted from: SEEA EA 2024 §6.32-6.45 (fisheries asset accounts); FAO SOFIA 2024 stock-status reporting categories.

¶7 *Table 3.4.1: Sustainable yield decision framework for fisheries management*

Stock Status (B/B _{MSY})	Catch Relative to SY	Depletion Recorded	Management Implication
>= 1.0 (healthy)	Catch <= SY	No	Maintain current TAC
>= 1.0 (healthy)	Catch > SY	Yes	Reduce TAC
< 1.0 (depleted)	Catch <= current SY	No	Stock stabilises at current level; active rebuilding requires catch below SY
< 1.0 (depleted)	Catch > current SY	Yes	Urgent TAC reduction

¶8 This decision matrix translates accounting outputs into management guidance. When a stock is healthy ($B \geq B_{MSY}$) and catch does not exceed sustainable yield, no depletion is recorded and the current TAC can be maintained. When catch exceeds sustainable yield even for a healthy stock, depletion is recorded in the asset account, and the TAC should be reduced to prevent the stock

from falling below its MSY benchmark. For depleted stocks, even catch levels at the current (reduced) sustainable yield merely stabilise the stock at its depleted level rather than rebuilding it. Active rebuilding requires catch below sustainable yield. Catch exceeding sustainable yield for a depleted stock represents the most urgent case for TAC reduction. Managers should interpret these categories together with the precautionary reference points set out in **TG-6.7** Section 3.1, and with due regard for uncertainty in stock assessment estimates⁷. Table 3.4.1 is the normative statement of this decision framework for the publication; TG-6.7 Section 3.7 records the corresponding depletion-recording rule from the compiler's side.

¶9 **Estimating current SY for depleted stocks:** For the two depleted rows in Table 3.4.1 ($B/B_{MSY} < 1.0$), "current SY" is the sustainable yield at the stock's actual (reduced) biomass, which is lower than MSY. The method depends on the data tier in use, and is specified in **TG-6.7** Sections 3.1 and 3.3. At the lowest tier only a linear approximation is available, $SY_{current} = MSY \times (B/B_{MSY})$, which is indicative only and, below B_{MSY} , gives a lower yield than the symmetric Schaefer curve ($MSY \times x(2 - x)$, with $x = B/B_{MSY}$); at higher tiers the assessment model supplies a current-biomass-conditional yield estimate directly and the approximation should not be substituted for it. The management consequence is that a quota set at the lowest tier carries a wider error band than the single number implies, and should be paired with a more conservative buffer.

3.4.2 Worked Example: Using Asset Account Data to Inform Quota Decisions

¶1 This worked example demonstrates how a fisheries management agency can use asset account data to assess stock status and adjust Total Allowable Catch quotas, using synthetic data for a hypothetical coastal demersal fishery.

¶2 **Scenario description:** The Coastal Demersal Fishery Management Authority oversees a commercially important snapper species within the national EEZ. The fishery is managed using annual TAC quotas allocated through an Individual Transferable Quota (ITQ) system. Stock assessment scientists conduct annual assessments using age-structured models calibrated to catch data, fishery-independent trawl surveys, and commercial CPUE indices. The authority compiles physical asset accounts for the snapper stock, integrated with the stock assessment process.

¶3 Step 1: Compile physical asset account

¶4 The authority compiled the following physical asset account for snapper stock for the accounting year 2024, based on the 2024 stock assessment:

Account Entry	Value (tonnes)	Data Source
Opening stock (1 Jan 2024)	42,900	Stock assessment biomass estimate
Additions to stock		
Natural growth (recruitment + growth)	14,300	Stock assessment recruitment and growth models
Upward reappraisals	0	No model revisions this year
Total additions	14,300	
Reductions in stock		
Gross catch (commercial fisheries)	10,500	Verified landing records + discard estimates
Normal losses (natural mortality)	5,800	Stock assessment natural mortality estimate
Catastrophic losses	0	No mass mortality events recorded
Uncompensated seizure (IUU fishing)	300	Surveillance-based IUU estimate
Total reductions	16,600	
Closing stock (31 Dec 2024)	40,600	Stock assessment biomass estimate
Derived measures		

Account Entry	Value (tonnes)	Data Source
Sustainable yield at current biomass	8,500	Estimated from surplus production curve at B = 40,600t
B _{MSY} (reference biomass)	55,000	Stock assessment MSY reference point
B/B _{MSY} ratio	0.74	40,600 / 55,000
Total removals (gross catch + IUU)	10,800	10,500 + 300
Depletion (total removals - sustainable yield)	2,300	10,800 - 8,500

¶5 Note: Sustainable yield is stock-dependent and varies with biomass. At the current depleted biomass of 40,600 tonnes (B/B_{MSY} = 0.74), the estimated sustainable yield of 8,500 tonnes represents the harvestable surplus above natural mortality: the quantity that can be removed by human harvest without reducing stock biomass below its current level. Depletion is therefore measured as total removals (gross catch plus all IUU extraction, whether by residents or non-residents) minus that harvestable surplus: 10,800 - 8,500 = 2,300 tonnes. Natural mortality of 5,800 tonnes is recorded separately in the reductions block as a stock-biological process distinct from the harvest-based depletion test, and it does not enter the depletion calculation. As the stock rebuilds toward B_{MSY}, sustainable yield will increase toward its maximum.

¶6 Step 1b: Compile monetary asset account

¶7 Using a unit resource rent approach (SEEA CF paras 5.441-5.452), the authority monetises the physical account. All figures are illustrative.

Monetary Account Entry	Basis	Value (USD)
Average landed price	USD 1,200/tonne	–
Average extraction cost (incl. normal profit)	USD 800/tonne	–
Unit resource rent	1,200 – 800	USD 400/tonne
Opening stock value	42,900t × USD 400	USD 17,160,000
Closing stock value	40,600t × USD 400	USD 16,240,000
Depletion value	2,300t × USD 400	USD 920,000
Resource rent from fishing	10,500t × USD 400	USD 4,200,000
Net fishing income (resource rent – depletion)	4,200,000 – 920,000	USD 3,280,000
Sustainable net income (SY × unit resource rent)	8,500t × USD 400	USD 3,400,000

¶8 The depletion value of USD 920,000 represents stock capital eroded in 2024. Net fishing income of USD 3,280,000 is the resource rent that remains after accounting for this capital draw-down. These monetary measures provide the inputs for depletion-adjusted GDP as described in Section 3.3.2.

¶9 Step 2: Assess stock status against decision framework

¶10 The authority applies the decision framework from Table 3.4.1:

- ¶11 **Stock status:** B/B_{MSY} = 0.74, indicating the stock is below MSY benchmark (depleted)
- ¶12 **Catch relative to sustainable yield:** Total removals (10,800) > sustainable yield (8,500), so depletion is recorded (2,300 tonnes)
- ¶13 **Decision category:** "< 1.0 (depleted)" AND "Catch > current SY" → **Urgent TAC reduction**

¶14 Step 3: Calculate TAC adjustment

¶15 The management authority determines that the TAC should be reduced to allow stock rebuilding. Two scenarios are considered:

¶16 *Scenario A: Reduce catch to current sustainable yield level*

- ¶17 Set TAC for 2025 at 8,500 tonnes (equal to current sustainable yield at present biomass)
- ¶18 This prevents further depletion but does not actively rebuild the stock
- ¶19 At this catch level, stock biomass would stabilise near the current level (approximately 40,600 tonnes), remaining below B_{MSY}

¶20 *Scenario B: Reduce catch below sustainable yield to enable rebuilding*

- ¶21 Set TAC for 2025 at 7,000 tonnes (below sustainable yield by 1,500 tonnes)
- ¶22 Stock expected to increase by approximately 1,500 tonnes per year
- ¶23 Rebuilding target: return to B_{MSY} (55,000 tonnes) within 10 years
- ¶24 Required annual rebuilding increment: $(55,000 - 40,600) / 10 = 1,440$ tonnes/year
- ¶25 TAC of 7,000 tonnes achieves this rebuilding trajectory

¶26 The authority selects Scenario B, setting the 2025 TAC at 7,000 tonnes, representing a 33% reduction from 2024 gross catch.

¶27 **Step 4: Communicate decision using asset account framework**

¶28 The authority publishes the decision with the following justification, grounded in asset accounting concepts:

"The 2024 physical asset account for snapper stock records closing biomass of 40,600 tonnes, 26% below the B_{MSY} reference level of 55,000 tonnes. Total removals of 10,800 tonnes (gross catch 10,500 plus IUU 300) exceeded sustainable yield of 8,500 tonnes, resulting in depletion of 2,300 tonnes of stock capital. To reverse this trajectory and rebuild the stock asset to sustainable levels within 10 years, the 2025 Total Allowable Catch is set at 7,000 tonnes. This reduction allows net stock growth of approximately 1,500 tonnes per year. Continued monitoring through annual asset accounts will track rebuilding progress, and the TAC will be adjusted as the stock approaches the MSY target."

¶29 **Step 5: Monitor rebuilding through subsequent accounts**

¶30 Monitoring actions for each assessment tier are set out in Table 3.4.1.

3.4.3 Evaluating Fisheries Subsidies

¶1 Governments provide various forms of support to fisheries, including fuel subsidies and vessel construction programmes. Ocean Accounts enable systematic assessment of:

- ¶2 The magnitude and composition of fisheries subsidies
- ¶3 Whether subsidies enhance capacity (potentially harmful) or improve sustainability (beneficial)
- ¶4 The distributional effects of subsidies across different types of fishing operations
- ¶5 Alignment with international commitments under SDG 14.6 and WTO fisheries subsidies disciplines⁸

3.4.4 Assessing Recovery Programs

¶1 For depleted stocks, recovery programmes aim to rebuild populations to sustainable levels. Ocean Accounts support:

- ¶2 Baseline measurement of stock status at programme initiation
- ¶3 Tracking of stock recovery through periodic asset accounts
- ¶4 Assessment of economic impacts during rebuilding periods (short-term costs)
- ¶5 Evaluation of long-term benefits from restored sustainable harvesting⁹

3.4.5 Quota Valuation and Management

¶1 Individual Transferable Quotas (ITQs) are an increasingly common approach to fisheries management. When quotas are freely traded, their market prices can inform the valuation of fish stocks¹⁰. Ocean Accounts support:

- ¶2 Recording quota values as assets (permits to use environmental assets under SEEA CF para 4.178)
- ¶3 Tracking changes in quota values over time
- ¶4 Distinguishing between the value of quotas and the value of underlying fish stocks
- ¶5 Assessing the equity implications of quota allocation systems

¶6 When using ITQ market prices to estimate the value of fish stock assets, compilers should be aware that quota prices may not fully reflect the underlying resource value. Quota markets are often thin (few transactions), geographically segmented, and subject to regulatory constraints on ownership concentration and foreign participation that can distort prices. In addition, quota prices reflect private expectations of future harvesting returns, which may diverge from the social value of the resource. Where quota markets exist, their prices can serve as a useful cross-check against net present value estimates derived from resource rent approaches. The primary reference for ITQ treatment as environmental assets is SEEA CF paras 4.178–4.180, which establish the asset classification for permits to use environmental assets. The valuation method (resource rent and net present value approaches) is provided in SEEA CF paras 5.441–5.452. Quota prices should not be treated as the sole basis for monetary asset valuation without careful assessment of market conditions¹¹.

3.4.6 Climate Change Adaptation

¶1 Climate change is affecting fish stock distribution, productivity, and sustainable yield levels. Ocean Accounts can support climate adaptation by:

- ¶2 Tracking shifts in stock distribution across spatial accounting units
- ¶3 Monitoring changes in condition indicators that may signal climate impacts
- ¶4 Adjusting sustainable yield estimates to account for changing environmental conditions
- ¶5 Informing adaptive management responses to climate-driven changes¹²

3.4.7 Community-level Fishery Accounting

¶1 The ocean accounting framework can be applied at both national and community scale to capture the economic contributions of small-scale and subsistence fishing that are often missed in standard economic surveys. The International Institute for Environment and Development (IIED) developed survey tools and toolkits examining subsistence and recreational supply of ocean-related natural inputs relevant to small-scale fisheries, with a focus on understanding how coastal communities depend on and contribute to ocean resources¹³. In a complementary effort, the Environmental Defense Fund (EDF) undertook community-level fisheries accounting work in Baja California, Mexico. That work demonstrated that accounting principles derived from the SEEA Central Framework and Ocean Accounts methodology could be operationalised at local scales to inform cooperative fisheries management.

¶2 These initiatives illustrated that structured accounting approaches can render visible the economic value of artisanal and subsistence catches: value that conventional national accounts frequently undercount or omit entirely. By capturing household-level resource flows and linking them to ecosystem condition indicators, community-scale accounts provide a bridge between national statistical frameworks and local management needs. The IIED/EDF framework (2015–2019) remains the most recent published methodology at the time of writing, and no formal superseding guidance has been published.

Case illustration: Community Fishery Accounts in Baja California (2015–2019)

Work by the International Institute for Environment and Development (IIED) on survey methodologies and toolkits for small-scale fisheries, together with efforts by the Environmental Defense Fund (EDF) beginning in 2015 in Baja California, Mexico, demonstrated that ocean accounting frameworks can be applied at the community scale. The EDF programme compiled fishery accounts for remote fishing villages, capturing the economic contributions of small-scale and subsistence fishing that are typically missed in standard economic surveys. These efforts highlight the potential for community-level accounts to complement national-level compilations, particularly for capturing non-market and subsistence ocean economy contributions¹⁴.

3.5 Where the data come from, and what that means for a decision

¶1 Fisheries account data sources – catch and landing statistics, stock assessment reports, vessel and licence registries, economic and employment surveys, trade statistics – and the intergovernmental series that complement them are set out in **TG-4.10 Extending Fisheries Statistics for Ecosystem-Based Management** Section 3.8 and **TG-4.3 Administrative Data Sources**. Two source limitations change what a manager can conclude, and should be established before a decision rests on the numbers.

¶2 **Reported landings are not total removals.** Illegal, unreported and unregulated catch sits outside the reported series, and the accounting treatment differs by who takes it: illegal catch by residents is still production by the national industry and belongs in gross catch, whilst illegal catch by non-residents is recorded as an uncompensated seizure – a transfer of national natural capital without compensation. Both enter total removals and therefore the depletion test, but only the first enters the production account. Estimation methods and their uncertainty are covered in TG-4.10 Section 3.8.4. Where no IUU estimate exists, a depletion figure computed from reported landings alone is a lower bound, and a quota set from it will be too generous by an unknown margin.

¶3 **Subsistence and recreational catch are often the missing block.** Both remove fish from the stock and both belong in the accounts, yet neither appears in commercial landing records. In several Pacific Island States subsistence and artisanal catch may equal or exceed commercial catch by volume whilst remaining largely unreported. A stock assessment and a quota built on the commercial series alone will misstate total removals in exactly those fisheries where food security is the binding consideration. Coverage approaches – benchmark landing-site surveys, fisheries modules in household income and expenditure surveys, food balance sheet cross-checks – are in TG-4.10 and **TG-4.2 Survey Methods**.

¶4 In both cases the decision-relevant question is not how the estimate is made but whether one exists at all, and what the accounts assume where it does not.

4. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

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DRAFT

OA and Environmental Impact Assessment

Provides guidance on using Ocean Accounts to support environmental impact assessment (EIA) and strategic environmental assessment (SEA) in marine settings.

Version 0.10.1

Status Draft

Stability Applied

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Drafting AI-assisted drafting from GOAP Secretariat source materials; source list to be published at the close of consultation.

OUTCOME

This Circular sets out how Ocean Accounts support environmental impact assessment and strategic environmental assessment in marine and coastal contexts: which account each stage of the assessment draws on, how to obtain it, and what it can and cannot establish. Effective assessment requires baseline data on environmental conditions, methods for predicting and evaluating impacts, and a framework for cumulative effects; accounts compiled to SEEA standards supply the first and third directly and constrain the second.

Decision use cases. Baseline establishment from extent and condition accounts (Section 3.1); cumulative impact assessment using time series and regional pressure inventories (Section 3.2); ecosystem service valuation for impact quantification (Section 3.3); damage cost estimation for predicted degradation (Section 3.5); and compensatory mitigation and offset calculation (Section 3.7). Section 3.6 maps these onto the screening, scoping, impact prediction, mitigation design and post-approval monitoring phases, with the data access pathway for each, and Section 3.8 works a coastal development assessment through end to end.

Where the methods are specified. The quantitative methods this Circular applies are set elsewhere and are not restated here: the degradation formula, its applicability conditions and the offset equivalence arithmetic in [TG-3.1 Asset Accounts](#) Section 3.5.3; the valuation preference order in [TG-2.4 Environmental \(including Ecosystem\) Goods and Services](#) Section 3.10; residual flow categories and the physical supply and use structure in [TG-3.4 Flows from Economy to Environment](#); and spatial resolution adequacy in [TG-2.12 Spatial Data Frameworks](#) Section 3.3. What this Circular adds is the judgement around them – when the simplified degradation approximation is not defensible, why a damage cost must be presented as a range, and why area equivalence in an offset is not service equivalence.

Related assessment contexts are covered in [TG-2.9 OA and Ocean Risk Assessment](#) and [TG-6.9 Offshore Energy](#).

CONTENTS

1. Outcome	3
2. Requirements	3
3. Guidance Material	4
3.1 Ocean Accounts as EIA Baseline Data	4
3.2 Cumulative Impact Assessment	5
3.3 Ecosystem Service Valuation in EIA	7
3.4 Residual Flows and Pollution Assessment	8
3.5 Ecosystem Degradation and Damage Cost Valuation	9
3.6 EIA-Account Integration Points	10
3.7 Linking Accounts to Approval Processes	12
3.8 Worked Example: EIA for Coastal Development Using OA Data	15
4. Acknowledgements	17
5. References	17

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DRAFT

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¶4 Related assessment contexts are covered in **TG-2.9 OA and Ocean Risk Assessment** and **TG-6.9 Offshore Energy**.

2. Requirements

¶1 This Circular requires familiarity with:

- ¶2 **TG-0.1 General Introduction to Ocean Accounts** – for foundational understanding of Ocean Accounts, the Ocean Accounts Framework, and the relationship between ecosystem accounting and decision support
- ¶3 **TG-3.1 Asset Accounts** – the hard prerequisite for detailed technical guidance on compiling condition accounts (Section 3.4.2) and asset accounts referenced throughout this Circular, including condition indicators, reference levels, condition indices, and asset valuation methods. Practitioners must be familiar with TG-3.1 before applying the baseline, impact prediction, valuation, and offset procedures in Sections 3.1 through 3.8.
- ¶4 **TG-3.2 Flows from Environment to Economy** – for detailed technical guidance on ecosystem service measurement and valuation approaches used in impact quantification

¶5 **Related Circulars:**

- ¶6 **TG-1.9 Safe Usage of Monetary Valuation** – provides guidance on appropriate use and interpretation of monetary values in decision contexts, essential for valuation applications in EIA
- ¶7 **TG-2.9 OA and Ocean Risk Assessment** – provides complementary guidance on hazard and risk assessment that informs the cumulative impact dimensions of EIA
- ¶8 **TG-3.7 Governance and Institutional Accounts** – provides context on the regulatory and institutional frameworks within which EIA operates

¶9 Readers approaching Section 1 for the first time should begin with **TG-1.0 Ocean Accounting and the Blue/Ocean Economy**, the framing circular for the section, which sets out the ocean economy terminology used throughout, what an ocean account can and cannot certify about a blue economy claim, and the map from a policy question to the circular that answers it. It is recommended reading, not a prerequisite.

3. Guidance Material

3.1 Ocean Accounts as EIA Baseline Data

¶1 Environmental impact assessment depends on establishing baseline conditions against which potential impacts can be measured. UNCLOS Article 206 establishes that states shall assess the potential effects of planned activities when there are reasonable grounds to believe they may cause substantial pollution or significant and harmful changes to the marine environment¹.

¶2 Ocean Accounts provide a structured framework for organising baseline data that serves EIA purposes. The SEEA Ecosystem Accounting framework identifies three primary account types that directly support baseline establishment²:

¶3 **Ecosystem extent accounts** record the area of different marine and coastal ecosystem types within defined spatial units. For EIA purposes, extent accounts establish the baseline distribution and area of ecosystems such as seagrass meadows, coral reefs, mangroves, kelp forests, and open water habitats within a project's area of influence. The IUCN Global Ecosystem Typology provides the reference classification for ecosystem types, which supports consistency across assessments³. Technical guidance on compiling extent accounts is provided in **TG-3.1 Asset Accounts**, Section 3.5.1.

¶4 **Ecosystem condition accounts** record the state of ecosystem assets relative to reference conditions. Following the SEEA Ecosystem Accounting approach, condition is measured through ecosystem characteristics organised into physical, chemical, compositional, structural, functional, and landscape/seascape categories⁴. For marine ecosystems, relevant characteristics include water quality parameters (temperature, salinity, dissolved oxygen, nutrient concentrations, pH), biodiversity indicators (species richness, population abundance, community composition), habitat structural complexity, and connectivity measures. Detailed guidance on condition account compilation is provided in **TG-3.1 Asset Accounts**, Section 3.4.2.

¶5 **Ecosystem services accounts** record the contributions of ecosystems to benefits used in economic and other human activity⁵. For EIA baseline purposes, services accounts document the current flows of provisioning services (fish provisioning, aquaculture production), regulating services (coastal protection, water purification, carbon sequestration), and cultural services (recreation, tourism, scientific research, spiritual and cultural values) that depend on the ecosystems within the project area. Technical guidance on services account compilation is provided in **TG-3.2 Flows from Environment to Economy**.

¶6 SEEA Ecosystem Accounting explicitly recognises EIA as one application of condition accounts, noting that condition data "can be used to inform policy- and decision-making across a range of sectors that impact or depend on ecosystems and natural resources, including land-use planning, environmental impact assessment, agricultural planning and authorization processes, and programmes for ecosystem rehabilitation or restoration"⁶.

Application procedure for EIA practitioners

¶1 To access and use Ocean Accounts data for EIA baseline development, practitioners should follow this procedure:

¶2 **Step 1: Identify relevant accounting areas.** Determine which Ecosystem Accounting Areas (EAAs) or Basic Spatial Units (BSUs) intersect with the proposed project's area of influence. Contact the national statistical office or environmental agency responsible for Ocean Accounts compilation to obtain spatial boundary files.

¶3 **Step 2: Obtain account data.** Request the most recent ecosystem extent accounts, condition accounts, and service flow accounts for the relevant EAAs. Ideally, request time series data covering at least two accounting periods to establish baseline trends rather than single-point-in-time values.

¶4 **Step 3: Assess spatial resolution.** Compare the spatial resolution of the accounts, typically compiled at regional or sub-national scale, with the scale of the proposed project. **TG-2.12 Spatial Data Frameworks** Section 3.3 sets the minimum mapping units and BSU resolution the accounts are compiled at, and the tests for whether that resolution is adequate to a given footprint. Where it is not, supplementary site survey is required, using methods consistent with the accounting framework classifications so that project monitoring data can be contributed back to the accounts in a later compilation cycle; where the survey uses remote sensing or geospatial methods, follow **TG-4.1 Remote Sensing and Geospatial Data**. Where account data are used directly as baseline, the resolution and its limitations should be documented in the assessment.

¶5 **Step 4: Extract baseline indicators.** From condition accounts, extract the values of condition variables relevant to the ecosystem types present in the project area. From extent accounts, extract opening extent (hectares or km²) for each ecosystem type. From service flow accounts, extract the annual flow rates of ecosystem services potentially affected by the project.

¶6 **Step 5: Document reference conditions.** Identify the reference levels used in the condition accounts and document these as the baseline against which project impacts will be assessed. Where account data are not available or are of insufficient spatial resolution, conduct supplementary baseline surveys using methods consistent with the accounting framework, enabling future contribution of project monitoring data back to the accounts.

3.2 Cumulative Impact Assessment

¶1 Marine ecosystems face cumulative effects from multiple activities and stressors operating over extended time periods and spatial scales. The FDES recognises that it is often not possible to establish direct cause-effect relationships between changes in environmental quality and individual human activities or natural processes, because impacts result from combined and cumulative processes and effects over space and time⁷.

¶2 Ocean Accounts support cumulative impact assessment through three mechanisms:

¶3 **Time series analysis:** Ocean Accounts are designed to be compiled regularly (ideally annually) to support ongoing monitoring and trend analysis⁸. This time series structure enables assessment of cumulative changes in ecosystem extent, condition, and service flows over extended periods. Where accounts record declining condition indices or contracting ecosystem extent over successive accounting periods, that record provides evidence of cumulative degradation that individual project EIAs should consider. Where coral reef extent accounts for a coastal region record a decline from 5,000 ha in 2020 to 4,200 ha in 2025, the resulting 16% reduction provides quantitative context for assessing whether an additional coastal development project would contribute to cumulative habitat loss beyond sustainable thresholds.

¶4 **Spatial integration:** The accounting framework integrates data across defined spatial units within Ecosystem Accounting Areas, supporting assessment of how multiple projects and activities within a region combine to affect ecosystem assets. The spatial aggregation from Basic Spatial Units to EAAs enables practitioners to assess whether localised project impacts, when combined with other activities within the broader region, may trigger ecosystem-scale responses.

¶5 **Physical flow accounts:** The SEEA Central Framework establishes accounts for physical flows between the economy and environment, including residual flows such as emissions, wastewater, and solid waste⁹. These physical supply and use tables (PSUTs) enable tracking of pollution loads, nutrient flows, and other pressures that cumulate across activities and time. For marine environments, relevant residual flows include nutrient discharges, sediment inputs, chemical pollutants, marine debris, and greenhouse gas emissions affecting ocean acidification and warming. Compiling PSUTs at regional scale allows practitioners to assess whether a proposed project's incremental loading would exceed assimilative capacity when added to existing background loads.

¶6 Where PSUTs for the relevant marine region have not yet been compiled, practitioners should take three steps. First, use point-source discharge registers and diffuse load models as interim substitutes for regional pollution load data. Second, structure and express results in a format consistent with future PSUT compilation (following the supply-and-use table structure in SEEA Central Framework Chapter 3⁹), so that project data can be incorporated once PSUTs are available. Third, document explicitly in the EIA report that PSUTs were unavailable and describe the substitute approach used. The five-step pollution assessment framework in Section 3.4 provides additional fallback guidance on data sources when PSUTs are absent.

¶7 The Taskforce on Nature-related Financial Disclosures (TNFD) defines impacts as “changes in the state of nature (quality or quantity), which may result in changes to the capacity of nature to provide social and economic functions. Impacts can be positive or negative. They can be the result of an organisation's or another party's actions and can be direct, indirect or cumulative”¹⁰. This definition emphasises that cumulative impacts manifest as changes in ecosystem state, which condition accounts are designed to measure.

¶8 For cumulative impact assessment in practice, Ocean Accounts support a structured approach:

¶9 **Table 1: Cumulative Impact Assessment Framework**

Step	Activity	Account Reference
1	Regional baseline	Ecosystem extent and condition accounts for relevant EAA
2	Trend analysis	Time series of condition indices and extent changes
3	Pressure inventory	Physical flow accounts for residual loads by source
4	Additionality assessment	Project incremental contribution to cumulative pressures
5	Threshold consideration	TG-3.1 Section 3.4.2 reference condition methodology; biophysical modelling guidelines (footnote 13)
6	Impact prediction	Expected condition change from cumulative pressures

¶10 The SEEA EA research agenda identifies the value of understanding ecosystem capacity and thresholds, noting connections to the “critical natural capital” concept in economics and the “planetary boundaries” concept in ecology¹¹. Consider a case in which condition accounts record that seagrass canopy density in a BSU has declined to 65% of its reference level, and the reference condition methodology (TG-3.1 Section 3.4.2) identifies 60% as the threshold below which carbon sequestration and nursery services decline non-linearly: an additional project loading that would push condition below this threshold warrants heightened scrutiny in cumulative assessment. The Guidelines on Biophysical Modelling for Ecosystem Accounting provides methods for assessing ecosystem capacity that can inform threshold identification¹².

¶11 Cumulative impact assessment requirements vary across regulatory frameworks but share common analytical needs that accounts can support. Under the EU Strategic Environmental Assessment (SEA) Directive (2001/42/EC), assessment of plans and programmes must consider cumulative effects on the environment, including biodiversity and ecosystem interactions. Under the United States National Environmental Policy Act (NEPA), agencies must consider cumulative impacts defined as impacts resulting from the incremental impact of the action when added to

other past, present, and reasonably foreseeable future actions. Ocean Accounts provide the time series data, spatial integration, and pressure-state linkages necessary for cumulative analysis in both contexts.

3.3 Ecosystem Service Valuation in EIA

¶1 Monetary valuation of ecosystem services can inform EIA by expressing environmental impacts in terms comparable to project economic benefits, and thus support more complete cost-benefit analysis. Readers should consult **TG-1.9 Safe Usage of Monetary Valuation** for detailed guidance on appropriate use of monetary valuation in decision contexts.

¶2 The SEEA Ecosystem Accounting framework establishes exchange values as the appropriate monetary concept for accounting purposes¹³. Exchange values, as defined in the SNA and adopted by the SEEA EA, represent “the values at which goods, services, labour or assets are in fact exchanged or else could be exchanged for cash”¹⁴. This differs from welfare values commonly used in environmental economics, which include consumer surplus and other non-market values.

¶3 **Clarification on value concepts for EIA practitioners:** Ocean Accounts produce exchange values and nothing else: all account components yield exchange values by construction, consistent with SNA national-accounting conventions. Welfare values (non-use values, consumer surplus, total economic value) are not produced by the accounts, and they require primary valuation studies (stated preference, revealed preference, or benefit transfer) conducted outside the accounts framework. An EIA practitioner using accounts for cost-benefit analysis must supplement with primary welfare-value studies if welfare values are needed. Welfare values cannot be derived from the accounts themselves. Practitioners must always label which value concept is being used and in what context: account outputs should be clearly identified as exchange values, and any supplementary welfare-value analysis should be identified as such and not conflated with the account figures. Cross-reference **TG-1.9 Safe Usage of Monetary Valuation** for detailed guidance on appropriate use and labelling of monetary values in decision contexts. The choice of value concept changes the result. Welfare values (including consumer surplus and non-use values) will typically be higher, and will therefore yield larger estimates of damage and of offset requirements. Misapplying exchange values to analyses intended to capture full social cost will systematically understate environmental damages.

¶4 Valuation methods are ranked by their proximity to observed market transactions. That preference order, the methods at each level, and the methods that are not admissible in accounts are specified in **TG-2.4 Environmental (including Ecosystem) Goods and Services** Section 3.10; **TG-1.9 Safe Usage of Monetary Valuation** Section 3.4 sets out what a decision-maker should ask of any figure produced under it.

¶5 For marine EIA the practical consequence is that most of the services at issue – coastal protection, water purification, nursery habitat – fall at the lower preference levels, where values rest on modelled rather than observed expenditure. A valuation of a coastal development’s impacts will typically combine a level 1 or 3 figure for fish provisioning with level 5 figures for regulating services, and the aggregate carries the uncertainty of the weakest component. Stating the preference level reached for each service, rather than presenting a single total, is what allows a consent authority to weigh the evidence properly.

¶6 For EIA applications, valuation can support:

- ¶7 **Impact quantification:** Expressing predicted changes in ecosystem services in monetary terms enables comparison with project economic benefits
- ¶8 **Mitigation prioritisation:** Valuation identifies which ecosystem services carry the greatest economic weight, and that ranking guides mitigation priorities. Where coastal protection services are valued at USD 12,000/ha/year whilst cultural services are valued at USD 800/ha/year,

mitigation efforts may prioritise protection of reef structures that deliver coastal protection over purely aesthetic considerations.

- ¶9 **Compensation determination:** Where residual impacts require offsetting, valuation informs compensation calculations using asset valuation approaches from **TG-3.1 Asset Accounts**
- ¶10 **Stakeholder communication:** Monetary values can communicate environmental significance to audiences more familiar with economic than ecological metrics

¶11 Important limitations apply. The SEEA EA acknowledges that “monetary values will not fully reflect the importance of ecosystems for people and the economy”¹⁵. Specific limitations relevant to EIA include:

1. ¶12 Many ecosystem services lack market values or close market analogues
2. ¶13 Non-use values (existence, bequest, option values) are excluded from exchange value accounting
3. ¶14 Indigenous and local community relationships with marine environments may not be adequately expressed through monetary valuation
4. ¶15 Exchange values may understate impacts on ecosystem services that are underpriced or unpriced in existing markets
5. ¶16 Valuation uncertainty may be substantial, particularly for services far from market transactions

¶17 EIA practitioners should use monetary values as one input alongside qualitative and non-monetary quantitative information about impacts. **TG-1.9 Safe Usage of Monetary Valuation** provides detailed guidance on contexts where monetary valuation is and is not appropriate, including the recommendation that physical accounts should always be compiled and published alongside monetary accounts to support appropriate interpretation.

3.4 Residual Flows and Pollution Assessment

¶1 Physical flow accounts within the SEEA Central Framework provide a systematic structure for recording emissions and residual flows from economic activities to the environment¹⁶. For marine and coastal EIA, these accounts support assessment of pollution impacts from proposed developments. The SEEA Central Framework defines emissions as “substances released to the environment by establishments and households as a result of production, consumption and accumulation processes”¹⁷, distinguishing emissions to air, water, and soil. For marine environments, the relevant residual flows are emissions to water, emissions to air, solid waste, and natural resource residuals such as bycatch discards and processing waste.

¶2 The residual flow categories relevant to marine and coastal EIA – emissions to water, emissions to air, solid waste, and natural resource residuals – and the physical supply and use table structure that records them are set out in **TG-3.4 Flows from Economy to Environment** Sections 3.2 and 3.3, with the source-attribution method in Section 3.5. An EIA draws four things from that structure.

¶3 **Source attribution.** Which activities contribute which loads to the receiving environment. Where a proposed aquaculture expansion is assessed against a coastal embayment in which aquaculture already contributes the largest share of nitrogen loading, the incremental case is materially different from one where the dominant source is land-based agriculture the proponent does not control.

¶4 **Baseline loading.** The total load entering the receiving environment from all sources, against which the project increment is compared. This is the number that determines whether an increment is marginal or decisive.

¶5 **Pathway.** Whether a residual is collected and treated or discharged directly, which is what establishes whether proposed treatment measures are adequate.

¶6 **Pressure-state linkage.** Pairing residual flow accounts with condition accounts gives an empirical relationship between load and ecosystem state in that specific water body, which is a far stronger basis for impact prediction than a generic dose-response relationship.

¶7 The FDES organises environmental statistics relevant to residuals into Component 3, covering emissions to air (3.1), wastewater generation and management (3.2), waste generation and management (3.3), and release of chemical substances (3.4)¹⁸. These statistics provide source data for compiling SEEA physical flow accounts.

¶8 For EIA application, integration of Ocean Accounts enables a five-step pollution assessment framework:

1. ¶9 **Baseline pollutant loading:** Reference existing physical flow accounts to characterise current residual flows to the marine environment within the project area. If PSUTs are unavailable, request data from environmental agencies on existing pollution loads by source category and discharge location.
2. ¶10 **Incremental loading:** Estimate additional residual flows from the proposed project using emission factors appropriate to the activity type, process technology, and any proposed treatment systems.
3. ¶11 **Cumulative loading:** Sum baseline and incremental loads to assess cumulative pollution pressure. Compare cumulative loading against water quality standards or ecosystem assimilative capacity thresholds.
4. ¶12 **Condition response:** Use established relationships between residual loads and ecosystem condition indicators (from historical accounts or scientific literature) to predict impact on condition accounts. Where historical data indicate that nitrogen loading >100 kg/ha/year correlates with seagrass canopy density <60%, this threshold informs impact prediction.
5. ¶13 **Service effects:** Trace how predicted condition changes may affect ecosystem service flows using the relationships documented in **TG-3.2 Flows from Environment to Economy**.

3.5 Ecosystem Degradation and Damage Cost Valuation

¶1 Ecosystem degradation (the decline in ecosystem condition) can be expressed in monetary terms using damage cost approaches that estimate the economic value of lost ecosystem service flows resulting from condition decline. This application is particularly relevant for EIA when quantifying residual impacts after mitigation, calculating compensation requirements, or comparing alternative development scenarios. The SEEA Ecosystem Accounting framework defines **ecosystem degradation** as the decline in the monetary value of an ecosystem asset resulting from declining condition during an accounting period¹⁹.

Applying the degradation calculation in an EIA

¶1 The degradation formula, the three conditions under which its simplified linear form is defensible, the decision checklist for testing them, and the discount-rate sensitivity requirement are specified in **TG-3.1 Asset Accounts** Section 3.5.3. An EIA practitioner applies that method rather than restating it; what follows is what the result is used for and where it fails.

¶2 **Run the applicability checklist before quoting a number.** The linear form assumes service loss is proportional to condition loss. TG-3.1 sets the conditions under which that holds – a small condition decline, no documented threshold response in the predicted range, and a single dominant service. Marine EIA frequently breaches all three at once: reef and seagrass systems have well-documented threshold responses, and a development that matters is usually one predicted to push condition through a range where more than one service changes. Where the checklist fails, a biophysical model is required and the linear figure should not be presented at all, not presented with a caveat.

¶3 **Present the damage cost as a range across discount rates.** TG-3.1 Section 3.5.3 requires sensitivity across rates because the choice materially changes the result – in the illustrative reef case

there, the damage cost varies roughly threefold between 2 per cent and 7 per cent. In a consent process this range is the finding. A single figure invites the decision to turn on an assumption that was never argued, and it will be attacked on exactly that ground.

¶4 **Value each major service separately.** Different services respond differently to the same condition change. Coral cover decline may reduce coastal protection close to linearly whilst reducing habitat services sharply once shelter structure is lost. Aggregating them before applying the condition change buries that difference and biases the total downwards.

¶5 **The damage cost is not the mitigation budget.** It is the estimated value of the loss, which supports comparison against the cost of avoiding it. Where mitigation costs less than the degradation it avoids, the case for requiring it is straightforward; where it costs more, the comparison is a starting point for deliberation and not a decision rule, because exchange values exclude non-use values and distributional effects entirely (Section 3.3).

3.6 EIA–Account Integration Points

¶1 The integration of Ocean Accounts into EIA practice follows the standard EIA process phases, with each phase drawing on different account types and data products. Figure 1.6.1 groups the EIA application procedure into scoping, assessment, and decision and monitoring phases. It sets out how each phase draws on multiple ocean account types, with the regulatory decision gate and the adaptive-management feedback loops shown explicitly. Table 4 maps these integration points.

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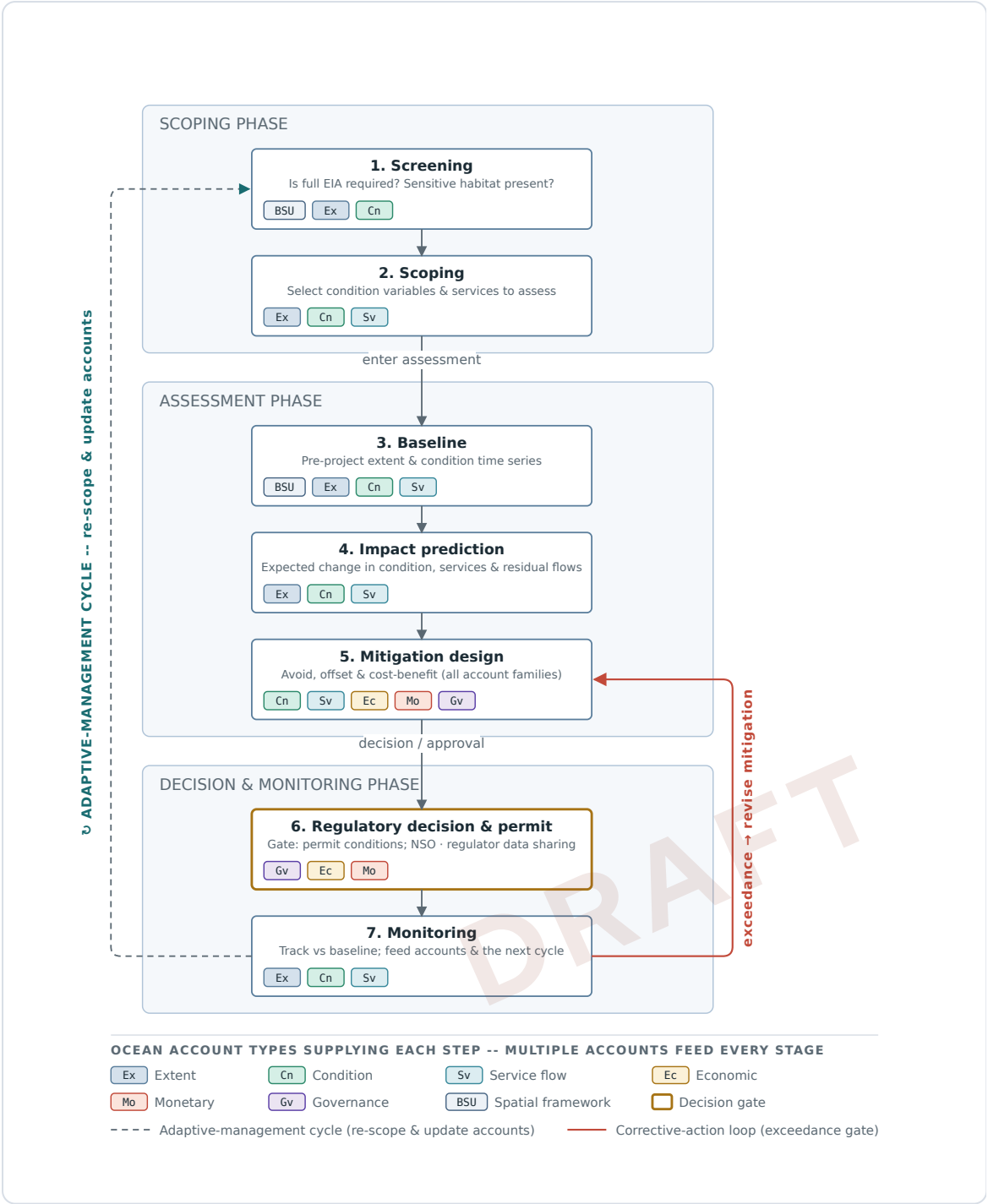


Figure 1.6.1 Seven EIA steps in Scoping, Assessment, and Decision & Monitoring phases draw on multiple ocean account types at every stage. [a] Colour chips = account types per step. [b] Dashed loops = adaptive management and corrective action. Scope: project-level EIA (SEA in text).

Source: TG-1.6 Environmental Impact Assessment, Section 3.6 (EIA phase / Ocean Account mapping, Table 4), Section 3.7 (approval processes, institutional arrangements, adaptive management) and Section 3.8 (worked example).

Adapted from: Espoo Convention 1991 (transboundary EIA); EU EIA Directive 2014/52/EU Annexes II.A, IV; SEEA EA 2024 Chapter 12 (applications of ecosystem accounts).

¶2 **Table 4: EIA-Account Integration Points**

EIA Phase	Account Input	Use in EIA	Data Access Pathway
Screening	Extent accounts	Identify sensitive ecosystem presence	Request EAA spatial layers (vector format, polygon boundaries) from the national statistical office (NSO) or designated environmental data custodian
Scoping	Condition accounts	Identify key condition variables to monitor	Request the condition account indicator dataset for relevant EAA from the NSO or national environmental agency; specify ecosystem types present in the project area
Baseline	Condition + extent accounts	Establish pre-project condition and extent	Request multi-year condition and extent time series (minimum two periods) from the NSO; where jurisdiction-specific data portals exist, see TG-3.7 for institutional mapping
Impact prediction	Service flow accounts	Quantify affected services	Request ecosystem service flow tables for relevant EAA from the NSO or environmental agency; where pathway varies by jurisdiction, consult TG-3.7 for the responsible institution
Mitigation design	Asset values	Cost-benefit of mitigation options	Request asset valuation coefficients or apply NPV methods from TG-1.9 using service flow data obtained in the impact prediction phase
Monitoring	Condition indicators	Track post-project changes	Use the same condition indicator dataset and spatial layer format obtained in the Scoping phase; submit monitoring results to the NSO under any established data-sharing protocol

¶3 During **screening**, ecosystem extent accounts identify whether sensitive or high-value ecosystem types are present within and adjacent to the proposed project area, informing decisions about whether full EIA is required. A simple query to the extent account database (e.g., “Are coral reefs, seagrass meadows, or mangroves present within 5 km of the project footprint?”) provides an efficient screening filter.

¶4 During **scoping**, condition accounts inform the selection of key condition variables to be monitored in project-specific baseline surveys and post-approval monitoring. By using the same condition variables as the national accounts, EIA practitioners ensure that project monitoring data can contribute to updating accounts in future compilation cycles.

¶5 At the **impact prediction** stage, ecosystem service flow accounts enable practitioners to quantify which services may be affected and estimate the magnitude of change. The linkages between condition variables and service flows documented in **TG-3.2 Flows from Environment to Economy** provide the basis for translating predicted condition changes into expected service flow impacts.

¶6 During **mitigation design**, monetary asset values from the accounts support cost-benefit comparison of alternative mitigation measures. Where protecting 10 hectares of reef costs USD 500,000 but provides USD 3,000,000 in avoided degradation (using asset valuation methods), the asset values demonstrate that protection is economically justified. During **monitoring**, condition indicators drawn from the accounting framework provide standardised metrics for tracking post-project changes against the same baselines used in the original assessment. Those metrics support adaptive management.

¶7 Post-approval monitoring can contribute data back to accounts, which establishes a feedback loop between project-level assessment and national accounting. Regulators should establish data-sharing protocols that enable project monitoring data to flow back to national accounts compilers.

3.7 Linking Accounts to Approval Processes

¶1 The procedural integration of Ocean Accounts into regulatory EIA processes requires consideration of institutional arrangements, data governance, and the distinct purposes of accounting versus assessment.

¶2 **Institutional arrangements:** Effective integration requires coordination between national statistical offices (NSOs) that typically lead ecosystem accounting, environmental regulatory agencies that administer EIA, and technical agencies that manage environmental monitoring data. The SEEA EA recognises this need, noting that “implementation necessitates a highly collaborative approach and the active participation of representatives of many different agencies and disciplines, including geography, ecology, economics and statistics”²⁰. For EIA integration, this collaboration should extend to environmental assessment practitioners and regulators through formal agreements specifying data access, update protocols, and reciprocal obligations.

¶3 **Data access and standardisation:** EIA practitioners require access to Ocean Accounts data in usable formats. This includes:

- ¶4 Spatial data on ecosystem extent at resolution relevant to project scales (ideally vector layers with <1 km² spatial units)
- ¶5 Condition account data for ecosystem types within project areas, including raw variable values and normalised indicators
- ¶6 Physical flow data for residual loads in project regions, disaggregated by source sector
- ¶7 Service flow data for ecosystem services potentially affected, including valuation coefficients where available

¶8 NSOs and environmental agencies should jointly develop data access portals or API services that enable EIA practitioners to query accounts by geographic coordinates, ecosystem type, or administrative region.

¶9 **Temporal alignment:** EIA timelines often do not align with accounting periods. Assessments may occur between account compilation years or require baseline data for periods before accounting began. Account data should be supplemented with project-specific surveys while ensuring consistency in methods and definitions with the accounting framework. Where accounts are compiled biennially or triennially rather than annually, interpolation methods may be needed to estimate conditions for intermediate years, with uncertainty clearly documented.

¶10 **Legal and procedural integration:** Formal integration of accounts into EIA requires regulatory recognition. Options include:

¶11 **Table 5: Regulatory Integration Mechanisms**

Integration Mechanism	Implementation Pathway
Guidance reference	Revise national EIA guidelines to specify accounts as preferred data source
Consistency requirements	Add review criterion to EIA terms of reference
Significance criteria	Adopt numerical thresholds linked to condition indices
Regional assessment	Compile accounts at EAA scale matching SEA boundaries
Offset calculation	Specify valuation methods consistent with SEEA EA

¶12 **Monitoring and follow-up:** Post-approval monitoring can contribute data back to accounts. Where EIA predicts impacts on specific condition indicators, monitoring these indicators strengthens both compliance verification and the accounts themselves. Regulators should establish reporting requirements that standardise monitoring data formats to facilitate integration with national accounts databases. The SEEA EA notes that accounts can support “the design and monitoring of policy responses” including “authorization processes”²¹.

Environmental offsets and no-net-loss policies

¶1 Where a regulatory regime requires residual impacts to be offset, the offset requirement formula, the definition of the restoration equivalence unit, the side-by-side equivalence check and the treatment of delayed offset delivery are specified in **TG-3.1 Asset Accounts** Section 3.5.3. Three points govern their use in a consent process.

¶2 **The accounts supply the metrics; the regulator sets the policy parameters.** Extent and condition data populate both sides of the equivalence. The multiplier, whether temporal discounting applies to delayed delivery, and whether financial compensation may substitute for a physical offset are matters for the applicable regime, and are not derived from the accounts. An EIA that presents a multiplier as though the accounting framework produced it misrepresents both.

¶3 **Both sides must use the same condition metric.** The requirement is computed from the condition of the habitat lost; delivery is computed from the condition *gain* achieved by the offsetting action. These are different quantities, and expressing one as an absolute index point and the other as a proportional change produces an equivalence that does not hold. TG-3.1 Section 3.5.3 works the arithmetic through, and the recurring finding is that restoration of degraded habitat delivers far fewer equivalence units than its area suggests – protecting high-condition habitat at risk of loss is frequently the only option that meets a requirement of any size.

¶4 **Area equivalence is not service equivalence.** Meeting the hectare-equivalent requirement does not establish that the service flows lost have been replaced. Where the lost habitat supplied coastal protection to a specific settlement, an offset elsewhere in the jurisdiction restores the area but not the protection, and the service supply-use articulation in **TG-3.2** is what makes that visible. Assessments should test both, and report the service test separately.

¶5 Post-implementation monitoring should track the same condition variables, using the same methods, as the accounts – which is what allows offset performance to be verified rather than asserted, and what allows a failed offset to trigger a management response. Offset accounting should remain consistent with the national Ocean Accounts framework so that project-level compensation and national ecosystem reporting stay coherent.

¶6 **Practical considerations for regulatory integration include:**

- ¶7 **Proportionality:** Account-based assessment should be proportionate to project scale and impact significance. Major projects warrant detailed integration. Minor projects may reference summary indicators.
- ¶8 **Uncertainty acknowledgment:** Both accounts and EIA involve uncertainty. Integration should maintain transparency about data quality and predictive confidence, using uncertainty ranges where feasible.
- ¶9 **Adaptive management:** Account time series enable adaptive management by tracking actual changes against EIA predictions, informing management responses when impacts exceed predictions.
- ¶10 **Transboundary considerations:** Marine ecosystems often cross jurisdictional boundaries. Account-based assessment can support transboundary EIA by providing consistent data frameworks across jurisdictions. The primary international framework for transboundary EIA is the Espoo Convention (Convention on Environmental Impact Assessment in a Transboundary Context, 1991), which establishes notification, consultation, and participation obligations among Parties when a proposed activity is likely to have significant adverse transboundary impacts. Regional seas programmes provide additional frameworks for data sharing and coordinated assessment: OSPAR (Convention for the Protection of the Marine Environment of the North-East Atlantic) governs transboundary assessment obligations across fifteen Parties in the North-East Atlantic, and the ASEAN Agreement on Transboundary Haze Pollution offers a regional model for coordinated environmental assessment in Southeast Asian marine contexts. National Ocean Accounts compiled consistently with SEEA EA provide the common data language for applying

these instruments. See also **TG-2.9 OA and Ocean Risk Assessment** for guidance on trans-boundary risk assessment.

3.8 Worked Example: EIA for Coastal Development Using OA Data

¶1 This section presents a synthetic worked example demonstrating how Ocean Accounts data support EIA for a proposed coastal resort development. The example illustrates the application procedure described in Section 3.1, the integration points mapped in Section 3.6, and the valuation and offset calculations detailed in Sections 3.3, 3.5, and 3.7.

Project description

¶1 A private developer proposes to construct a 200-room coastal resort on a 15-hectare site at Coral Bay, including hotel buildings, marina facilities for 50 vessels, wastewater treatment infrastructure, and beach access amenities. The project is located within the Coral Bay Ecosystem Accounting Area, for which the national statistical office compiles annual ocean accounts.

Step 1: Screening and account data access

¶1 The EIA practitioner contacts the NSO to obtain ecosystem extent accounts for the Coral Bay EAA. The extent account records the following within 2 km of the proposed site:

- ¶2 120 hectares of fringing coral reef (condition index 0.72)
- ¶3 45 hectares of seagrass meadow (condition index 0.68)
- ¶4 180 hectares of mangrove forest (condition index 0.75)

¶5 The presence of these sensitive ecosystems triggers full EIA requirements under national regulations.

Step 2: Baseline establishment from condition accounts

¶1 The practitioner requests condition accounts for the three ecosystem types. The accounts provide baseline values for six ECT classes²²:

¶2 Coral Reef Condition Variables (2025 baseline):

- ¶3 A1 Physical: Sea surface temperature 28.2°C (reference: 27.5°C)
- ¶4 A2 Chemical: pH 8.05 (reference: 8.15)
- ¶5 B1 Compositional: Coral species richness 42 species (reference: 55 species)
- ¶6 B2 Structural: Live coral cover 38% (reference: 55%)
- ¶7 B3 Functional: Net calcification 4.8 kg CaCO₃/m²/yr (reference: 7.0)
- ¶8 C Seascape: Connectivity index 0.65 (reference: 0.85)

¶9 These baseline values establish the pre-project state against which impacts will be assessed.

Step 3: Impact prediction using condition-service relationships

¶1 The project Environmental Impact Statement predicts that marina construction will directly impact 2 hectares of coral reef and 1 hectare of seagrass through dredging. Indirect impacts from increased turbidity, nutrient loading, and visitor pressure are predicted to reduce coral reef condition index from 0.72 to 0.60 across an additional 8 hectares (total 10 ha affected, with 2 ha direct loss and 8 ha degradation).

¶2 Using ecosystem service flow accounts from **TG-3.2 Flows from Environment to Economy**, the practitioner quantifies affected services:

¶3 Coral Reef Services (per hectare per year):

- ¶4 Coastal protection (avoided damage): USD 8,500/ha/yr
- ¶5 Fish nursery habitat: USD 1,800/ha/yr
- ¶6 Tourism/recreation: USD 3,200/ha/yr

- ¶7 Total annual flow: USD 13,500/ha/yr

¶8 Seagrass Services (per hectare per year):

- ¶9 Coastal stabilisation: USD 2,000/ha/yr
- ¶10 Carbon sequestration: USD 400/ha/yr (at USD 50/tonne CO₂)
- ¶11 Fish nursery habitat: USD 1,200/ha/yr
- ¶12 Total annual flow: USD 3,600/ha/yr

Step 4: Degradation and damage cost calculation

¶1 Using methods from Section 3.5:

¶2 Coral reef degradation:

- ¶3
Extent loss (2 ha): Asset value = 2 ha × (USD 13,500/yr / 0.04) = USD 675,000. Note: extent loss applies the full asset value per hectare regardless of current condition (0.72), consistent with SEEA EA depletion accounting – the entire asset is permanently removed, so the full reference-condition value is the appropriate measure of loss.
- ¶4
Condition decline (8 ha, a decline of 0.12 index points from 0.72 to 0.60): Degradation = 8 ha × (USD 13,500/yr / 0.04) × 0.12 = USD 324,000
- ¶5
Total coral reef damage: USD 675,000 + USD 324,000 = **USD 999,000**

¶6 Seagrass degradation:

- ¶7 Extent loss (1 ha): Asset value = 1 ha × (USD 3,600/yr / 0.04) = USD 90,000

¶8 Total damage cost: USD 1,089,000

¶9 This quantification enables cost-benefit comparison with project economic benefits (estimated at USD 8,500,000 NPV over 30 years) and informs mitigation design.

Step 5: Mitigation design and residual impact assessment

¶1 The developer proposes three mitigation measures:

1. ¶2 Relocate marina to sandy substrate, avoiding direct coral reef impact (saves 2 ha reef, cost USD 400,000)
2. ¶3 Install advanced wastewater treatment to reduce nutrient loading by 80% (reduces condition decline from 8 ha to 3 ha, cost USD 250,000)
3. ¶4 Implement visitor management plan limiting reef access (further reduces degraded area from 3 ha to 2 ha, cost USD 50,000)

¶5 Residual impacts after mitigation:

- ¶6 Seagrass loss: 1 ha (damage cost USD 90,000)
- ¶7 Coral condition decline: 2 ha with a decline of 0.12 index points (damage cost 2 ha × (USD 13,500/yr / 0.04) × 0.12 = USD 81,000)
- ¶8 **Total residual damage: USD 171,000**

¶9 Mitigation cost: USD 700,000

¶10 Avoided damage: USD 1,089,000 - USD 171,000 = USD 918,000

¶11 Cost-benefit analysis indicates mitigation is economically justified (ratio of avoided damage to mitigation cost = USD 918,000 / USD 700,000 = 1.31).

Step 6: Offset calculation

¶1 For residual impacts, regulators require a 3:1 biodiversity offset (regulator-specified, see Section 3.7 note on multipliers):

¶2 **Seagrass offset:** Applying the full formula: $1 \text{ ha} \times 0.68$ (condition of lost seagrass, from Step 1) $\times 3 = 2.04 \text{ ha-equivalents required}$. The developer commits to restoring 15 hectares of degraded seagrass from condition 0.50 to 0.80. This delivers a net gain of $15 \times 0.30 = 4.5 \text{ ha-equivalents}$, which comfortably exceeds the 2.04 ha-equivalent requirement.

¶3 **Coral offset:** For this degradation (not extent-loss) case, the formula factor is the condition decline rather than the condition of lost habitat, treating the calculation as condition-weighted hectares of effective loss: $2 \text{ ha} \times 0.12$ (absolute condition decline) $\times 3 = 0.72 \text{ ha-equivalents required}$. The developer commits to funding a 5-hectare marine protected area expansion. This protects reef at condition 0.75 from fishing pressure that would otherwise reduce condition to 0.55, delivering $5 \times 0.20 = 1.0 \text{ ha-equivalents}$. This exceeds the requirement of 0.72 ha-equivalents.

Step 7: Monitoring using account indicators

¶1 The approved EIA includes monitoring requirements using the same condition variables as national accounts:

- ¶2 Annual monitoring of coral cover, species richness, and pH at 10 fixed stations within 1 km of development
- ¶3 Biennial seagrass surveys measuring canopy density and extent
- ¶4 Quarterly water quality monitoring for nutrients, turbidity, and temperature

¶5 Monitoring data will be provided to the NSO to support future account updates. This allows assessment of whether actual impacts match predictions and whether offsets achieve intended outcomes.

4. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

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1. ¶21 United Nations. (2021). *System of Environmental-Economic Accounting–Ecosystem Accounting*, para 5.126.
2. ¶22 The A1/A2/B1/B2/B3/C1 classification follows the SEEA EA Ecosystem Condition Typology (Table 5.1, SEEA EA 2021) and is developed in detail in [TG-3.1 Asset Accounts](#), Section 3.5.2 (ecosystem condition accounts). The groupings may differ slightly across ecosystem types. TG-3.1 Section 3.4.2 provides ecosystem-specific indicator lists.

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OA and Multilateral Development Finance

Helps finance ministry officials and project developers use Ocean Accounts data to build stronger business cases for multilateral development finance.

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Status Draft

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OUTCOME

After reading this Circular, finance ministry officials and project developers will be able to use Ocean Accounts to build stronger business cases for multilateral development finance: which accounts and indicators an MDB or vertical fund needs at each stage of the project cycle, and how to present them so they meet appraisal and safeguard requirements.

Readers will learn how account outputs map onto MDB project appraisal, what role each of exchange values and welfare values plays in the cost-benefit analysis an MDB expects (Section 3.2), how account metrics verify compliance with environmental and social safeguard policies (Section 3.3), and how the accounts feed sustainable finance classification and nature-related disclosure requirements (Section 3.4). Section 3.5 gives a five-step procedure across the identification, preparation, appraisal, implementation and evaluation phases; Section 3.6 works a blue bond impact report; Section 3.7 sets out four case applications.

Key decision contexts supported by this guidance include: MDB project appraisal using ocean accounting baselines, blue bond verification and impact reporting, Small Island Developing States (SIDS) ocean finance tracking for SDG 14.7 implementation, and Green Climate Fund and Global Environment Facility results frameworks that require quantified natural capital metrics. The structured information from Ocean Accounts provides the common baseline across these financing contexts. Ocean dependencies, environmental outcomes, and financial risks related to nature loss can then be measured on consistent terms.

Three adjacent topics are treated elsewhere and cross-referred rather than repeated: investment readiness and the evidence a proposal must carry, in [TG-0.8 Implementation Readiness Assessment](#) Section 3.8; disclosure-framework mapping for TNFD, IFRS and CBD Target 15, in [TG-1.11 OA and the Private Sector](#) Section 3.3; and counterfactual design for post-investment monitoring, in [TG-1.3 OA and Marine Spatial Management](#) Section 3.4.3.

CONTENTS

1. Outcome 3

2. Requirements 3

3. Guidance Material 4

 3.1 Ocean accounts and multilateral development finance 4

 3.2 Natural capital in project appraisal 6

 3.3 Aligning with MDB environmental and social safeguards 7

 3.4 Monitoring, reporting and disclosure frameworks 9

 3.5 Application procedures for development finance institutions 10

 3.6 Worked example: Blue bond impact report using ocean accounting data 12

 3.7 Case applications 14

4. Acknowledgements 15

5. References 15

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2. Requirements

¶1 **Essential prerequisites:**

- ¶2 **TG-0.1 General Introduction to Ocean Accounts** – for the foundational understanding of Ocean Accounts structure, including the distinction between stocks and flows, the relationship to the System of National Accounts (SNA) and System of Environmental-Economic Accounting (SEEA), and the multiple-capitals framework for wellbeing and sustainability
- ¶3 **TG-0.2 Overview of Relevant Statistical Standards** – for background on the relationship between SNA and SEEA frameworks that underpins the multilateral finance application

¶4 **Helpful background:**

- ¶5 **TG-1.8 OA and Project-Level Finance** – detailed guidance on applying Ocean Accounts at the individual project scale, including project-specific cost-benefit analysis and results monitoring
- ¶6 **TG-2.4 Environmental (including Ecosystem) Goods and Services** Section 3.10 – valuation methods for ocean ecosystem services and assets, including discount rate selection and welfare value estimation
- ¶7 **TG-2.6 Ocean-related Investment** – methodological guidance on compiling ocean-related investment indicators, including gross fixed capital formation and sustainable finance instruments

¶8 Readers approaching Section 1 for the first time should begin with **TG-1.0 Ocean Accounting and the Blue/Ocean Economy**, the framing circular for the section, which sets out the ocean

economy terminology used throughout, what an ocean account can and cannot certify about a blue economy claim, and the map from a policy question to the circular that answers it. It is recommended reading, not a prerequisite.

¶9 ⓘ Framework Position

¶10 This Circular addresses how ocean accounts inform multilateral ocean finance by tracking monetary flows to ocean assets, economic contributions to coastal community conditions, and ecosystem service values that underpin investment decisions. In the Ocean Accounts Framework (TG-0.1 Figure 0.1.2):

Edge	Direction	Description
E3	FG1 ↔ SG1	Monetary flows between assets and economic sectors
E5	FG1 → SG2	Economic contributions to social conditions
E9	SG3 → FG1	Ecosystem services to economy

3. Guidance Material

3.1 Ocean accounts and multilateral development finance

¶11 Multilateral development banks (MDBs) collectively provide hundreds of billions of dollars in development financing annually, with increasing attention to climate adaptation, biodiversity conservation, and sustainable blue economy development¹. The principal MDBs include the World Bank Group, Asian Development Bank, African Development Bank, Inter-American Development Bank, European Bank for Reconstruction and Development, and Asian Infrastructure Investment Bank. Vertical climate and biodiversity funds, including the Green Climate Fund (GCF) and Global Environment Facility (GEF), provide additional financing channels with specific environmental mandates. The distinction between MDBs and vertical funds matters in practice because their appraisal processes differ: MDBs typically apply economic rate-of-return tests and safeguard compliance frameworks, whereas vertical funds such as the GCF and GEF employ investment criteria centred on paradigm-shift potential, climate rationale, or global environmental benefits. Practitioners should tailor their use of ocean accounting data to the specific requirements of the financing institution being approached.

¶12 The 2025 System of National Accounts (SNA) introduces new guidance on sustainability measurement that directly supports the use of accounting frameworks in development finance contexts. Chapter 35 of the 2025 SNA explains that accounting-based approaches that bring together information in a structured way and cover multiple capitals “provide an excellent structure for the required baseline information” for assessments of sustainability, capacity, resilience and risk². The SNA further notes that “the use of a common baseline across different assessments can enhance the usefulness of assessments for decision makers since the differences across assessments can be more readily compared”³.

¶13 For development finance purposes, Ocean Accounts can provide this common baseline by organising data on:

- ¶14 The stocks and condition of marine and coastal natural capital assets
- ¶15 The flows of ecosystem services from ocean environments
- ¶16 The economic contribution of ocean-related sectors to national production
- ¶17 The dependencies of coastal communities and ocean industries on ecosystem services
- ¶18 The physical and monetary dimensions of environmental pressures and responses

¶19 This structured information addresses core elements of MDB project appraisal: the economic rationale for investment, the baseline against which results will be measured, the environmental and social context in which projects operate, and the sustainability of anticipated benefits over time.

¶10 The 2025 SNA also introduces guidance on accounting for areas beyond national jurisdiction (ABNJ), noting that where there is interest in organising data about natural capital outside the scope of the national accounts, “the accounting definitions and treatments of the integrated framework of the SNA and the SEEA can be applied”⁴. The ABNJ guidance is particularly relevant for ocean financing that spans exclusive economic zones and high seas areas.

Downward connections to accounts, indicators and data

¶11 Ocean Accounts support four operational functions for multilateral development finance across the project cycle.

¶12 **Baseline establishment for project appraisal.** In the Ocean Accounts Framework (TG-0.1), the valuation of ecosystem services flowing to the economy corresponds to Edge E9 (ecosystem services to economy), which underpins the natural capital rationale for development finance investment. Ecosystem extent accounts (**TG-3.1 Assets**) establish pre-project stocks of marine habitats such as coral reefs, mangroves, and seagrass meadows. Ecosystem condition accounts record baseline health metrics: coral cover percentages, mangrove regeneration rates, and water quality indicators that define the starting point for impact assessment. Physical flow accounts (**TG-3.2 Flows from Environment to Economy**) quantify provisioning services such as fish catch and regulating services such as coastal protection, measured in physical units (tonnes of fish, linear kilometres of shoreline protected). These baselines are essential for MDB appraisal methodologies, which require quantified evidence of the natural capital at risk or the ecosystem services that investments will protect or enhance.

¶13 **Results measurement for monitoring frameworks.** Once a project is under way, flow accounts provide the monitoring data required by MDB results frameworks and vertical fund reporting requirements. Ocean economy thematic accounts (**TG-2.5 Structure and Function of the Ocean Economy**) track economic outcomes such as employment in sustainable fisheries or tourism revenues from marine protected areas. Investment indicators (**TG-2.6 Ocean-related Investment**) measure capital formation in ocean sectors, including gross fixed capital formation (GFCF) in vessels, port infrastructure, and aquaculture facilities. These indicators track whether development finance is catalysing additional private investment. Asset accounts document changes in natural capital stocks, and those changes indicate whether financed interventions are achieving their intended conservation or restoration outcomes. The time-series structure of Ocean Accounts enables before-and-after comparison essential for impact evaluation.

¶14 **Risk assessment for financial structuring.** Asset accounts quantify the natural capital stocks on which proposed investments depend, informing risk assessment. Coastal infrastructure investments, for example, depend on the coastal protection services provided by mangroves and reefs. Where extent and condition accounts record declining trends in these ecosystems, the physical risk to project viability rises. Ocean economy accounts identify sectoral dependencies on ecosystem services. Tourism depends on water quality and biodiversity, aquaculture on water quality and waste assimilation, and fisheries on spawning habitat and nursery grounds. Quantifying these dependencies enables MDBs to assess nature-related risks to project cash flows, as anticipated by the emerging frameworks for nature-related financial disclosure (TNFD, IFRS S1) discussed in Section 3.4 below. Dependency measures show where a project is exposed, not how large a financial loss would be: translating exposure into effects on cash flows needs further analysis of how far a service could decline and whether the project could replace it⁵.

¶15 **Indicator reporting for policy targets.** Beyond project-specific results, Ocean Accounts provide the source data for compiling indicators relevant to multilateral financing targets. SDG 14.7.1 (sustainable fisheries as proportion of GDP) can be derived from ocean economy thematic accounts by identifying the value added of sustainably managed fisheries relative to total GDP. SDG 14.5 (marine protected area coverage) can be reported from spatial extent accounts. GCF and GEF proposals require indicators on ecosystem condition, livelihoods, and climate adaptation benefits.

Ocean Accounts provide the standardised measurement framework for compiling these indicators in a manner consistent with international statistical standards. For guidance on deriving these indicators, see **TG-2.10 MEA Indicators**.

The data pipeline to capital

¶1 Ocean Accounts serve four distinct functions in creating a data pipeline from structured environmental-economic information to investable capital. Understanding these functions helps practitioners design accounting programmes that directly support finance mobilisation, rather than treating accounts as stand-alone statistical products.

¶2 **Function 1: Baseline valuation.** Before any ocean-related investment can be appraised, investors require a credible estimate of the natural capital stock at risk or under management. Ocean Accounts provide this through ecosystem extent accounts (measuring the area and spatial configuration of marine and coastal ecosystems), ecosystem condition accounts (documenting the quality of those ecosystems against reference benchmarks), and monetary asset accounts (estimating the net present value of expected ecosystem service flows). Compiled according to SEEA EA standards, these three account types produce the baseline valuation that anchors investment decisions. Without such baselines, project proponents must rely on ad hoc studies that lack comparability and are difficult for institutional investors to benchmark across jurisdictions.

¶3 **Function 2: Risk assessment.** Financial institutions now recognise nature-related risks as material to portfolio performance. Here, Ocean Accounts document trends in ecosystem condition over time, identify dependencies between economic activities and ecosystem services through supply and use tables, and quantify the economic exposure of sectors to ecosystem degradation⁶. When supply and use accounts record the tourism sector's use of reef-based recreation services, the sector's exposure is quantified. Declining coral reef condition, recorded in the condition accounts, signals the hazard; whether it becomes realised loss also depends on the sector's vulnerability, which the accounts do not measure. This function aligns directly with the TNFD risk assessment approach (see Section 3.4 below) and provides the structured data that underlies TNFD's LEAP assessment process.

¶4 **Function 3: Standardised impact indicators.** Investors require impact metrics that are comparable across projects, jurisdictions, and time periods. Because Ocean Accounts follow internationally agreed classifications and measurement boundaries, they yield indicators that meet this requirement. Ecosystem extent change (hectares of mangrove restored), condition improvement (water quality index relative to baseline), and service flow enhancement (tonnes of carbon sequestered per year) are all derivable from standard account tables. The templates aligning these account-derived indicators with TNFD, IFRS S1/S2 and CBD Target 15 are in **TG-1.11** Section 3.3.4.

¶5 **Function 4: Post-investment monitoring.** After capital has been deployed, ongoing monitoring determines whether environmental outcomes are being achieved and whether financial instrument covenants are being met. Ocean Accounts provide the monitoring infrastructure through time-series compilation of the same accounts used for baseline valuation. Because accounts use consistent classifications and spatial boundaries over time, they enable rigorous before-after comparison without the methodological discontinuities of ad hoc monitoring approaches. Counterfactual design for post-investment monitoring is in **TG-1.3** Section 3.4.3.

¶6 For these functions applied to project-level instruments, see **TG-1.8 OA and Project-Level Finance**.

3.2 Natural capital in project appraisal

¶1 The appraisal of development projects traditionally relies on cost-benefit analysis (CBA) to assess whether expected benefits exceed expected costs over the project lifetime. The SEEA Ecosystem Accounting (SEEA EA) framework, adopted as an international statistical standard in 2021, provides guidance on how ecosystem service values can be systematically incorporated into

such analyses⁷. Detailed guidance on valuation methods is provided in **TG-1.9 Safe Usage of Monetary Valuation**.

¶12 The SEEA EA distinguishes between exchange values used in accounting (reflecting market prices or equivalent transaction values) and welfare values used in traditional cost-benefit analysis (reflecting total willingness to pay including consumer surplus). These two value concepts serve different purposes in development finance, and practitioners should be clear about which they are using and why. Both have roles:

1. ¶13 **Exchange values** from ecosystem accounts provide a conservative, transaction-based measure that is directly comparable with other economic statistics including GDP and national wealth accounts. These values are appropriate for national accounting purposes, for assessing the macroeconomic significance of ecosystem contributions, and for ensuring consistency with broader national accounts data submitted to MDBs.
2. ¶14 **Welfare values** from complementary assessments provide a fuller measure of total economic value that captures benefits to users beyond what they actually pay. MDB economic analysis guidance (including the World Bank's guidance on economic analysis of investment operations) typically requires welfare values for cost-benefit analysis because they reflect the full social benefits and costs relevant to public investment decisions.

¶15 In practice, practitioners preparing MDB project submissions should use welfare values as the primary basis for project-level cost-benefit analysis, consistent with standard MDB appraisal methodology, whilst referencing exchange values from the ecosystem accounts to establish the baseline asset stocks and service flows from which welfare-based assessments are conducted. The SEEA EA notes that "data from the ecosystem accounts can provide inputs to [externality] assessments through its recording of changes in ecosystem condition and changes in ecosystem services flows that arise as a result of a particular activity"⁸. This complementary use of both value concepts ensures that project documentation is grounded in the accounting framework while meeting MDB appraisal requirements.

¶16 When preparing project documentation for MDB financing, practitioners should:

1. ¶17 Use ecosystem accounts to establish baseline values for marine and coastal ecosystem assets in the project area
2. ¶18 Use ecosystem service flow accounts to quantify the current value of services provided to beneficiaries
3. ¶19 Apply net present value (NPV) approaches using appropriate discount rates to estimate changes in asset values under project scenarios
4. ¶110 Present welfare values as the primary input to cost-benefit analysis, supplemented by exchange values from the accounts to demonstrate consistency with the national statistical framework

¶11 In the Ocean Accounts Framework (TG-0.1), these monetary flows between economic sectors and ocean assets correspond to Edge E3 (monetary flows between assets and economic sectors), which captures the financial transactions that development finance institutions seek to quantify and appraise. The SEEA Central Framework provides detailed guidance on NPV approaches to asset valuation, noting that the net present value "is the value of an asset determined by estimating the stream of income expected to be earned in the future and then discounting the future income back to the present accounting period"⁹. This approach is directly applicable to valuing changes in ecosystem asset values under alternative project scenarios. For ecosystem assets, the choice of discount rate significantly affects valuations. The SEEA notes that "there is also support for the use of social discount rates in the valuation of environmental assets" given their "broad and long-term value to society as a whole"¹⁰.

3.3 Aligning with MDB environmental and social safeguards

¶1 Multilateral development banks operate under environmental and social safeguard policies that establish requirements for project assessment, stakeholder engagement, and impact mitigation. Ocean Accounts provide data that can demonstrate compliance with and strengthen performance under these safeguards.

¶2 The principal MDB safeguard frameworks include the World Bank Environmental and Social Framework (ESF), the Asian Development Bank Safeguard Policy Statement (SPS 2009), the African Development Bank Integrated Safeguards System (ISS), and the Inter-American Development Bank Environmental and Social Policy Framework. The ESF comprises ten Environmental and Social Standards (ESSs) covering assessment and management of environmental and social risks. Whilst these frameworks differ in detail and procedural requirements, they share common substantive requirements summarised in Table 3.3.0 below.

¶3 **Table 3.3.0: Common substantive requirements across MDB safeguard frameworks**

Requirement	Description
Environmental assessment	Systematic evaluation of potential environmental impacts and identification of mitigation measures.
Biodiversity conservation	Protection of natural habitats, critical ecosystems, and species of conservation concern.
Climate resilience	Consideration of climate change impacts and adaptation requirements.
Sustainable use of natural resources	Ensuring that resource extraction does not exceed sustainable yields.
Indigenous peoples and local communities	Recognition of rights and meaningful consultation.

¶4 Ocean Accounts organised under the SEEA framework directly address several of these requirements. Ecosystem extent accounts record the areas of different marine and coastal ecosystem types and supply the baseline data for habitat protection targets. Ecosystem condition accounts track the state of ecosystems against reference benchmarks, which supports assessment of project impacts on ecosystem health. Asset accounts for fisheries and other biological resources record extraction relative to sustainable yields, the evidence required to demonstrate compliance with sustainable use requirements¹¹.

MDB safeguard-account alignment

¶1 Table 1 summarises how specific MDB safeguard policy requirements can be verified using metrics from ocean account components.

¶2 **Table 1: MDB Safeguard-Account Alignment**

MDB Safeguard Policy	Relevant Account	Account Metric	Verification Method	Downward Connection
Environmental assessment	Condition accounts	Condition index change	Pre/post comparison	TG-2.1
Biodiversity conservation	Extent accounts	Habitat area change	Spatial analysis	TG-3.1 Section 3.1
Pollution prevention	Residual flow accounts	Emission quantities	Physical flow data	TG-3.4
Sustainable resource use	Asset accounts	Extraction vs regeneration	Stock-flow reconciliation	TG-3.1 Section 3.3

¶3 In each case, the ocean account provides a standardised, repeatable measurement that can serve as the baseline for safeguard assessment and the monitoring indicator for safeguard compliance during project implementation. Condition accounts record changes against reference benchmarks, so environmental assessment requirements rest on quantitative data. Extent accounts docu-

ment habitat area by ecosystem type, which is the direct evidence for biodiversity conservation obligations. Residual flow accounts track pollutant discharges in physical units. Those figures carry the pollution prevention reporting, whilst asset accounts track extraction relative to regeneration for biological resources and so demonstrate sustainable use.

¶4 The 2025 SNA identifies that “a related area of work is the assessment of enterprises’ exposure to environmental risks, including climate risks and risks emerging from declines in nature and biodiversity. This work extends from assessing the physical risks to quantifying the financial risks to corporations, including through their supply chains”¹². Ocean Accounts provide the baseline information needed to conduct such assessments in the context of development projects.

¶5 For climate resilience, Ocean Accounts can document:

- ¶6 The current extent and condition of coastal ecosystems that provide natural protection (mangroves, coral reefs, seagrass meadows)
- ¶7 The value of coastal protection services under current conditions
- ¶8 The exposure of coastal infrastructure and populations to climate-related hazards
- ¶9 Projected changes in ecosystem service provision under climate scenarios

¶10 SDG 14 (Life Below Water) target 14.2 calls for sustainable management and protection of marine and coastal ecosystems. Target 14.7 calls on SIDS and LDCs to increase economic benefits from the sustainable use of marine resources. Ocean Accounts can directly monitor both targets. For guidance on compiling SDG 14 indicators from Ocean Accounts, see **TG-2.10 MEA Indicators**. In the Ocean Accounts Framework (TG-0.1), socio-economic benefits flowing from financed ocean activities to coastal communities correspond to Edge E5 (economic contributions to social conditions).

3.4 Monitoring, reporting and disclosure frameworks

¶1 Requirements for sustainability monitoring, results reporting, and nature-related financial disclosure now shape the development finance landscape. Ocean Accounts can support compliance with these frameworks by providing structured, comparable data over time.

¶2 **Sustainable finance classification:** The 2025 SNA introduces guidance on measuring sustainable finance, including green bonds and sustainability-linked financial instruments. The 2025 SNA distinguishes ESG finance (encompassing environmental, social, and governance objectives) from green finance (limited to environmental improvement). It defines green finance as “finance for activities or projects that sustain or improve the condition of the environment”¹³. Ocean Accounts provide the baseline and monitoring data needed to verify that financed activities achieve environmental improvements, and that verification addresses ‘greenwashing’ concerns in sustainable finance markets. The SNA notes that “to support assessments of the effectiveness of sustainable finance, it is relevant to present data on the levels of investment in ESG and green activities ... alongside data about the outcomes arising from that activity”¹⁴. Detailed guidance on compiling ocean investment indicators, including sustainable finance instruments, is provided in **TG-2.6 Ocean-related Investment**.

¶3 **Nature-related financial disclosure:** The Taskforce on Nature-related Financial Disclosures (TNFD) provides a framework for companies and financial institutions to report on nature-related dependencies, impacts, risks and opportunities¹⁵. The TNFD recommendations are structured around four pillars (governance, strategy, risk management, and metrics and targets) that parallel the climate-related disclosures established under the Task Force on Climate-related Financial Disclosures (TCFD) and now incorporated into IFRS Sustainability Disclosure Standards¹⁶.

¶4 TNFD-aligned reporting is currently voluntary for most MDB borrowers, and no MDB has yet mandated full TNFD-aligned disclosure as a condition of financing. Several MDBs are nonetheless integrating nature considerations into their operational requirements. The International Finance Corporation (IFC), for instance, has incorporated biodiversity and ecosystem service considera-

tions into its Performance Standards. Regulatory developments in the European Union, the United Kingdom, and other jurisdictions are driving a broader trend towards mandatory nature-related disclosure, so voluntary adoption now will facilitate compliance as requirements evolve. Practitioners are advised to treat TNFD-aligned reporting as an emerging expectation that strengthens financing proposals, even where it is not yet formally required.

¶5 Ocean Accounts can support TNFD-aligned reporting by providing:

- ¶6 Data on dependencies on ocean ecosystem services (regulating services such as coastal protection, provisioning services such as fisheries)
- ¶7 Data on impacts on ocean ecosystems (pollution, habitat conversion, resource extraction)
- ¶8 Baseline condition metrics against which nature-related risks can be assessed
- ¶9 Physical and monetary indicators for target-setting and performance monitoring

¶10 **IFRS sustainability disclosure:** The International Sustainability Standards Board (ISSB) has established IFRS S1 (General Requirements for Disclosure of Sustainability-related Financial Information) and IFRS S2 (Climate-related Disclosures) as global baseline standards for sustainability reporting¹⁷. IFRS S1 establishes that sustainability-related information is useful to primary users because “an entity’s ability to generate cash flows over the short, medium and long term is inextricably linked to the interactions between the entity and its stakeholders, society, the economy and the natural environment throughout the entity’s value chain”¹⁸. For development projects, alignment with these disclosure frameworks enhances credibility with international investors and demonstrates that borrowing countries are building the data infrastructure needed for participation in global sustainable finance markets.

3.5 Application procedures for development finance institutions

¶1 This section provides a step-by-step procedure for development finance institutions and borrowing country agencies to use Ocean Accounts in preparing and appraising financing proposals. The procedure is structured around the typical MDB project cycle: identification, preparation, appraisal, approval, implementation, and evaluation.

Step 1: Identification phase—scoping the role of ocean natural capital

¶1 During the project identification phase, practitioners should determine whether ocean natural capital is material to the proposed investment. Key questions include:

- ¶2 Does the project area include marine or coastal ecosystems recorded in national extent accounts?
- ¶3 Do project activities depend on ocean ecosystem services (water supply, coastal protection, fisheries habitat)?
- ¶4 Will project activities generate pressures on ocean environments (pollution, habitat conversion, resource extraction)?
- ¶5 Are baseline data from Ocean Accounts available for the project location?

¶6 If Ocean Accounts have been compiled for the country, practitioners should consult spatial extent accounts (**TG-3.1**) to determine whether the project footprint overlaps with mapped marine or coastal ecosystem assets. If no spatial accounts are available, practitioners should identify whether the country has compiled at least national-level ecosystem extent and condition data that can inform the project design.

Step 2: Preparation phase—establishing baselines and dependencies

¶1 During project preparation, Ocean Accounts provide the baseline data required for MDB appraisal documentation. Practitioners should:

1. ¶2

Extract baseline natural capital stocks: From ecosystem extent and condition accounts, extract the area and condition scores for ecosystem types within or adjacent to the project area. For example, for a coastal infrastructure project, document the extent of mangrove forests, seagrass meadows, and coral reefs within a defined buffer zone.

2. ¶3

Quantify ecosystem service flows: From physical and monetary ecosystem service flow accounts (**TG-3.2**), quantify the provisioning, regulating, and cultural services currently provided by ocean ecosystems in the project area. For example, for a fisheries management project, document the current sustainable catch potential (tonnes per year), the value of that catch (monetary units), and the number of people dependent on fishing livelihoods.

3. ¶4

Identify economic dependencies: From ocean economy thematic accounts (**TG-2.5**), identify the economic sectors active in the project area and their contribution to regional employment and GDP. This establishes the economic context for assessing project benefits.

4. ¶5

Document environmental pressures: From residual flow accounts (**TG-3.4**), document current levels of pollution, waste discharge, and resource extraction that the project aims to address or that the project will generate.

Step 3: Appraisal phase—demonstrating economic rationale and safeguard alignment

¶1 During MDB appraisal, Ocean Accounts support the economic analysis and safeguard compliance documentation:

1. ¶2

Economic analysis: Use NPV approaches to value ecosystem assets under alternative project scenarios (with-project versus without-project). For guidance on valuation methods, see **TG-1.9**. Present welfare values as the primary input to cost-benefit analysis, supplemented by exchange values from the ecosystem accounts to demonstrate consistency with national accounts. Document the discount rate used and justify its appropriateness for long-lived ecosystem assets.

2. ¶3

Safeguard compliance: Use the account-safeguard alignment in Table 1 to populate safeguard screening tools and environmental and social impact assessments. For example, to demonstrate compliance with biodiversity safeguards, cite extent account data documenting that the project area includes X hectares of critical habitat, and present the project design measures to avoid, minimise, or compensate for impacts on those habitats.

3. ¶4

Results framework: Define project results indicators using metrics from Ocean Accounts. For example, an outcome indicator might be “area of mangrove habitat restored (hectares)” measured from extent accounts, and an impact indicator might be “coastal protection services provided (linear kilometres of shoreline)” measured from ecosystem service flow accounts.

Step 4: Implementation phase—monitoring and adaptive management

¶1 During project implementation, Ocean Accounts provide the monitoring data for results frameworks and safeguard compliance:

1. ¶2

Annual monitoring: Update extent, condition, and flow accounts on an annual basis for the project area. Compare monitored values against the baseline established in Step 2 and the targets defined in the results framework.

2. ¶3

Mid-term review: At mid-term, use time-series account data to assess whether the project is on track to achieve its natural capital targets. If condition accounts record declining trends in ecosystem health despite project interventions, this triggers adaptive management actions.

3. ¶4

Safeguard monitoring: Report on safeguard indicators using account data. For example, if the safeguard framework requires reporting on water quality, use residual flow accounts to report nutrient loading (kg nitrogen per year) or biochemical oxygen demand.

Step 5: Evaluation phase—impact assessment and lessons learned

¶1 At project completion, Ocean Accounts enable rigorous impact evaluation:

1. ¶2

Before-and-after analysis: Compare pre-project baselines (from Step 2) with post-project conditions (from Step 4) to assess the magnitude of change attributable to the project. Use statistical methods to control for confounding factors where possible.

2. ¶3

Attribution analysis: Use the integrated structure of Ocean Accounts to trace impacts through the system. For example, if the project restored mangroves, document the change in mangrove extent (from extent accounts), the change in fish biomass in associated waters (from asset accounts), and the change in fisheries livelihoods (from ocean economy accounts).

3. ¶4

Cost-effectiveness assessment: Compare the cost per unit of ecosystem service provided or natural capital restored against alternative approaches. For example, calculate the cost per hectare of mangrove restored, and compare against the cost of equivalent grey infrastructure for coastal protection.

3.6 Worked example: Blue bond impact report using ocean accounting data

¶1 This example demonstrates how a national government or subnational entity can use Ocean Accounts to prepare an annual impact report for blue bond investors that satisfies both use-of-proceeds verification and key performance indicator (KPI) monitoring requirements.

¶2 **Context:** A coastal state has issued a USD 100 million blue bond to finance ocean conservation and sustainable blue economy development. Bond proceeds are allocated to three use-of-proceeds categories: marine protected area management (40 per cent), sustainable fisheries infrastructure (35 per cent), and coastal ecosystem restoration (25 per cent). The bond covenants require annual reporting on use of proceeds and performance against KPIs.

¶3 **Use-of-proceeds verification using Ocean Accounts:** Ocean Accounts provide the data infrastructure to verify that bond proceeds are directed to eligible activities:

1. ¶4

Marine protected area management: Government expenditure accounts (**TG-1.1** Section 3.3) classify ocean-related public expenditure by function, including expenditure on protected area management under the Classification of the Functions of Government (COFOG) 05.4 (Protection of biodiversity and landscape). The government reports that USD 40 million of bond proceeds were disbursed to protected area management agencies, verifiable against budget execution records. Extent accounts (**TG-3.1**) document that the funded protected areas cover 1.2 million hectares of marine ecosystems, including coral reefs, seagrass meadows, and pelagic zones.

2. ¶5

Sustainable fisheries infrastructure: Investment accounts (**TG-2.6** Section 3.3) track gross fixed capital formation (GFCF) in ocean industries by asset type. The government reports that USD 35 million of bond proceeds financed capital investments in fisheries monitoring systems, cold chain infrastructure, and vessel upgrades, recorded under GFCF in machinery and equip-

ment and transport equipment. Physical supply and use tables (**TG-3.2**) document that the funded infrastructure serves fisheries extracting 45,000 tonnes of fish per year from stocks assessed as within biologically sustainable levels.

3. ¶6

Coastal ecosystem restoration: Environmental protection expenditure accounts (SEEA CF Chapter IV) track expenditure on environmental protection purposes, including ecosystem restoration under COFOG 05.4. The government reports that USD 25 million of bond proceeds financed mangrove and seagrass restoration activities. Extent accounts document that the funded restoration activities increased mangrove extent by 3,200 hectares and seagrass extent by 1,800 hectares.

¶7 **KPI monitoring using Ocean Accounts:** The blue bond covenants define four KPIs, each linked to specific ocean accounting data sources:

¶8 **KPI 1: Biodiversity conservation (target: maintain or improve coral reef health).** Condition accounts (**TG-3.1 Asset Accounts** Section 3.5.2) provide the data source. The government reports that coral cover within funded marine protected areas was 32 per cent at bond issuance (baseline year) and 35 per cent in the reporting year, measured through standardised reef monitoring surveys compiled into the condition accounts. This 3 percentage point improvement meets the KPI target, and the data are compiled annually to enable time-series monitoring of reef health.

¶9 **KPI 2: Water quality (target: reduce nutrient loading by 10 per cent).** Residual flow accounts (**TG-3.4**) track emissions to water bodies in physical units. Nitrogen loading to coastal waters in the project areas fell from 1,200 tonnes per year at baseline to 1,050 tonnes per year in the reporting year, a 12.5 per cent reduction that exceeds the KPI target. Wastewater treatment is not among the bond's three use-of-proceeds categories, so the reduction is reported as a change in the outcome indicator and is not attributed to bond-financed activity. These data are compiled quarterly and aggregated to annual figures for bondholder reporting.

¶10 ⓘ **Corrected 24 September 2026**

¶11 This KPI previously attributed the nitrogen reduction to wastewater treatment funded by bond proceeds, but wastewater treatment is not one of the bond's use-of-proceeds categories, so the attribution has been removed.

¶12 **KPI 3: Blue carbon sequestration (target: sequester 50,000 tonnes CO₂-equivalent per year).** Carbon stock accounts (SEEA CF Chapter 3) measure carbon storage in biomass and soils for coastal ecosystems. Drawing on carbon sequestration rates from **TG-6.2 Mangrove and Coastal Wetland Accounting** and **TG-6.3 Seagrass Ecosystem Accounting**, the government reports that the 3,200 hectares of restored mangroves and 1,800 hectares of restored seagrass funded by bond proceeds sequester an estimated 48,000 tonnes CO₂-equivalent per year. The estimate sits slightly below the first-year target, though sequestration rates will increase as restored ecosystems mature.

¶13 **KPI 4: Fishing employment (target: maintain or increase formal employment in sustainable fisheries).** Ocean economy thematic accounts (**TG-2.5** Table 3.2) track employment by ocean industry, including marine fishing and aquaculture. Formal employment in marine fishing rose from 32,000 persons at baseline to 33,500 persons in the reporting year, a 4.7 per cent increase attributed to improved fisheries management and infrastructure that reduced post-harvest losses and raised the economic viability of small-scale fisheries. Employment data are sourced from labour force surveys and compiled into the economic activity accounts.

¶14 **Outcome data presentation:** Table 2 presents the KPI performance data in a format suitable for inclusion in the annual blue bond impact report.

¶15 **Table 2: Blue Bond KPI Performance (Reporting Year 1)**

KPI	Baseline	Target	Actual	Status	Account Source
Coral cover (%)	32	≥32	35	Met	Condition accounts
Nitrogen loading (tonnes/year)	1,200	≤1,080	1,050	Exceeded	Residual flow accounts
Blue carbon (tonnes CO ₂ e/year)	0	50,000	48,000	Approaching	Carbon stock accounts
Fishing employment (persons)	32,000	≥32,000	33,500	Exceeded	Economic activity accounts

¶16 Beyond the project cycle, three further uses of ocean accounts in development finance are treated elsewhere in the publication rather than repeated here:

- ¶17 **Investment readiness of nature-based solutions** – the minimum evidence a proposal needs and how a country assesses whether it has it: **TG-0.8 Implementation Readiness Assessment** Section 3.8.
- ¶18 **Impact indicator templates for TNFD, IFRS S1/S2 and CBD Target 15 – TG-1.11 OA and the Private Sector** Section 3.3, which is the single owner of disclosure-framework mapping.
- ¶19 **Post-investment monitoring and counterfactual design – TG-1.3 OA and Marine Spatial Management** Section 3.4.3 for BACI, matching and regression discontinuity designs; the re-reporting-cycle alignment specific to each instrument is in TG-1.8.

¶20 For sovereign natural capital in fiscal frameworks and the fiscal case for preventive investment, see **TG-1.1 OA and National Budget Processes**. For structuring blue bonds and other project-level instruments, see **TG-1.8 OA and Project-Level Finance**.

3.7 Case applications

¶1 The following illustrative examples demonstrate how Ocean Accounts can be applied in multilateral development finance contexts. These are stylised applications intended to illustrate the range of use cases. As implementation experience from GOAP partner countries accumulates, future versions of this Circular will incorporate empirical case studies.

¶2 **Application 1: Coastal resilience infrastructure financing**

¶3 A coastal state seeks financing from an MDB for integrated coastal protection that combines grey infrastructure (sea walls, drainage) with nature-based solutions (mangrove restoration, coral reef rehabilitation). Ocean Accounts support the financing proposal by:

- ¶4 Documenting current mangrove and coral reef extent through ecosystem extent accounts
- ¶5 Quantifying coastal protection services currently provided through ecosystem service flow accounts
- ¶6 Valuing ecosystem assets using NPV approaches to show the value of natural capital at stake
- ¶7 Establishing monitoring baselines for both ecosystem condition and service provision
- ¶8 Demonstrating alignment with SDG 14 targets on coastal ecosystem resilience

¶9 The ecosystem accounts enable comparison of full project benefits (including nature-based components) against a conventional grey-infrastructure-only alternative, which may demonstrate superior cost-effectiveness and co-benefits. For project-level implementation details, see **TG-1.8 OA and Project-Level Finance**.

¶10 **Application 2: Sustainable fisheries programme**

¶11 An MDB considers financing an integrated fisheries management programme including stock assessment, monitoring and surveillance, market access improvements, and community development. Ocean Accounts inform the programme design by:

- ¶12 Recording current fish stock levels through asset accounts for aquatic biological resources
- ¶13 Documenting extraction relative to maximum sustainable yield through physical supply and use tables

- ¶14 Identifying the economic contribution of fisheries through ocean economy thematic and extended accounts
- ¶15 Mapping the geographic distribution of fishing activity and coastal community dependence
- ¶16 Projecting stock recovery trajectories under improved management scenarios

¶17 The asset accounts demonstrate that current depletion exceeds sustainable levels, providing economic justification for management investment. The 2025 SNA treatment of depletion as a cost of production means that unsustainable extraction is now reflected in reduced net national income, which strengthens the fiscal case for intervention¹⁹.

¶18 **Application 3: Blue economy development**

¶19 A regional development bank supports a multi-sector blue economy programme spanning marine tourism, sustainable aquaculture, and renewable ocean energy. Ocean Accounts provide the integrated information base by:

- ¶20 Measuring the baseline contribution of each sector through ocean economy thematic and extended accounts
- ¶21 Identifying spatial conflicts and synergies among ocean uses
- ¶22 Documenting ecosystem service dependencies (tourism depends on water quality and biodiversity, and aquaculture depends on water quality and waste assimilation)
- ¶23 Establishing condition metrics for the marine ecosystems that underpin economic activities
- ¶24 Supporting spatial planning to optimise across multiple objectives

¶25 The accounts enable results-based monitoring that tracks both economic and environmental outcomes and demonstrates to financiers that blue economy growth is occurring within ecological limits.

¶26 **Application 4: Climate adaptation fund proposal**

¶27 A small island developing state (SIDS) seeks financing from the Green Climate Fund for climate adaptation investments. Ocean Accounts strengthen the proposal by:

- ¶28 Documenting the economic dependence on ocean-related activities (fisheries, tourism, maritime transport)
- ¶29 Quantifying natural capital stocks at risk from climate change impacts (coral reef bleaching, sea level rise, ocean acidification)
- ¶30 Valuing ecosystem services that provide natural adaptation benefits (coastal protection, carbon sequestration)
- ¶31 Establishing dependency and exposure indicators linking ecosystem condition to economic outcomes
- ¶32 Providing the monitoring framework for results-based payment arrangements

¶33 SDG 14 target 14.7 calls on countries to increase economic benefits from sustainable marine resources. Ocean Accounts provide the data infrastructure to measure progress against this target and to demonstrate the climate rationale for ocean investments.

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¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

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OA and Project-Level Finance

Helps conservation finance practitioners and project developers use Ocean Accounts to structure, verify, and report on project-level finance instruments.

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DRAFT

1. Outcome

2. Requirements

3. Guidance Material

3.1 Blue Bonds and Ocean-Linked Securities

3.2 Debt-for-Nature Swaps

3.3 Payments for Ecosystem Services

3.4 Carbon and Blue Carbon Finance

3.5 Disclosure and Verification Requirements

3.6 Downward Connections to Accounts, Indicators, and Data

3.7 Worked Example: Mangrove Restoration Project Cost-Benefit Analysis

3.8 Application Procedure for Project Developers

3.9 From ground-level projects to investor due diligence

4. Acknowledgements

5. References

ABOUT THIS CIRCULAR

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https://guidance.oceanaccounts.org/circulars/section-1/1.8-project-finance/

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Decision Use Cases

Project-level finance decisions supported by Ocean Accounts include:

1. Cost-benefit analysis for restoration projects – Using ecosystem service values from Ocean

Accounts to assess whether expected benefits of mangrove restoration, seagrass rehabilitation, or coral reef protection exceed project costs over the relevant time horizon.

2. TNFD-aligned impact reporting – Demonstrating changes in ecosystem condition, extent, and service provision resulting from financed activities, meeting TNFD disclosure requirements for nature-related impacts and dependencies.

3. Project ROI assessment – Calculating return on investment for blue economy projects by quantifying multiple ecosystem service benefits (carbon sequestration, coastal protection, fisheries habitat, tourism amenity) using comparable monetary valuation methods from [TG-2.4 Environmental \(including Ecosystem\) Goods and Services](#) Section 3.10.

4. Baseline and counterfactual scenarios – Establishing pre-project conditions and projected no-action baselines against which project impacts can be measured, enabling additional demonstration required by carbon credit standards and impact investors.

This Circular is relevant to project developers, conservation finance practitioners, sovereign debt managers, development finance institutions, and account compilers supporting sustainable ocean finance initiatives. The guidance builds on the multilateral finance context described in [TG-1.7 OA and Multilateral Development Finance](#), the valuation methods in [TG-2.4](#) Section 3.10 and the guidance on whether and when to value in [TG-1.9 Safe Usage of Monetary Valuation](#), and the ecosystem asset foundations in [TG-3.1 Assets](#). It also supports the ecosystem-specific accounting methodologies in [TG-6.2 Mangrove and Coastal Wetland Accounting](#) and [TG-6.3 Seagrass Ecosystem Accounting](#), which provide blue carbon measurement foundations relevant to many of the finance instruments discussed here.

1. Outcome

¶1 After reading this Circular, conservation finance practitioners and project developers will be able to use Ocean Accounts to structure, verify and report on project-level finance instruments – blue bonds and sustainability-linked securities, debt-for-nature swaps, payments for ecosystem services, blue carbon instruments, parametric insurance and blended finance. For each, Sections 3.1 to 3.4 state which account entries supply the baseline, which supply the KPIs, and which support verification; Table 0 summarises the field. Section 3.7 works a mangrove restoration cost-benefit analysis and Section 3.8 gives a seven-step procedure for a project developer.

¶2 Country-level readiness to support these instruments – whether the evidence base, counterfactual, targets and monitoring commitment are in place – is assessed in **TG-0.8 Implementation Readiness Assessment** Section 3.8 rather than here, and disclosure-framework mapping in **TG-1.11 OA and the Private Sector** Section 3.3.

¶3 The 2025 System of National Accounts recognises sustainable finance as a measurement domain, defining ESG (Environmental, Social, Governance) finance and green finance as components of financial instruments that sustain or improve environmental and social conditions.¹ Ocean Accounts operationalise these concepts for marine contexts by providing the structured data needed to assess ocean-related risks, dependencies, and opportunities. Sustainable ocean finance directly supports SDG 14 (“Life Below Water”) targets, including Target 14.7 on increasing economic benefits from sustainable use of marine resources.² The Kunming-Montreal Global Biodiversity Framework Target 15 calls on businesses and financial institutions to regularly monitor, assess, and transparently disclose their nature-related risks, dependencies, and impacts, a requirement that Ocean Accounts can support.³

¶4 Decision Use Cases

¶5 Project-level finance decisions supported by Ocean Accounts include:

1. ¶6

Cost-benefit analysis for restoration projects – Using ecosystem service values from Ocean Accounts to assess whether expected benefits of mangrove restoration, seagrass rehabilitation, or coral reef protection exceed project costs over the relevant time horizon.⁴

2. ¶7

TNFD-aligned impact reporting – Demonstrating changes in ecosystem condition, extent, and service provision resulting from financed activities, meeting TNFD disclosure requirements for nature-related impacts and dependencies.⁵

3. ¶8

Project ROI assessment – Calculating return on investment for blue economy projects by quantifying multiple ecosystem service benefits (carbon sequestration, coastal protection, fisheries habitat, tourism amenity) using comparable monetary valuation methods from **TG-2.4 Environmental (including Ecosystem) Goods and Services** Section 3.10.⁶

4. ¶9

Baseline and counterfactual scenarios – Establishing pre-project conditions and projected no-action baselines against which project impacts can be measured, enabling additionality demonstration required by carbon credit standards and impact investors.⁷

¶10 This Circular is relevant to project developers, conservation finance practitioners, sovereign debt managers, development finance institutions, and account compilers supporting sustainable ocean finance initiatives. The guidance builds on the multilateral finance context described in **TG-1.7 OA and Multilateral Development Finance**, the valuation methods in **TG-2.4** Section 3.10 and the guidance on whether and when to value in **TG-1.9 Safe Usage of Monetary Valuation**, and the ecosystem asset foundations in **TG-3.1 Assets**. It also supports the ecosystem-specific accounting

methodologies in **TG-6.2 Mangrove and Coastal Wetland Accounting** and **TG-6.3 Seagrass Ecosystem Accounting**, which provide blue carbon measurement foundations relevant to many of the finance instruments discussed here.

2. Requirements

¶1 Essential prerequisites:

- ¶2 **TG-0.1 General Introduction to Ocean Accounts** – for the conceptual framework and key components of Ocean Accounts
- ¶3 **TG-1.7 OA and Multilateral Development Finance** – for the multilateral finance context and how development finance institutions engage with ocean accounting

¶4 Helpful background:

- ¶5 **TG-2.4 Environmental (including Ecosystem) Goods and Services** Section 3.10 – for valuation methodology selection and the exchange value hierarchy
- ¶6 **TG-3.1 Assets** – for ecosystem asset accounting foundations and natural capital measurement
- ¶7 **TG-2.6 Ocean-related Investment** – for investment indicator compilation using the GFCF framework
- ¶8 **TG-6.2 Mangrove and Coastal Wetland Accounting** – for blue carbon accounting in mangroves and coastal wetlands
- ¶9 **TG-6.3 Seagrass Ecosystem Accounting** – for seagrass carbon and ecosystem services measurement
- ¶10 **TG-6.9 Offshore Energy Thematic Methods** – for project-level accounting in offshore renewable energy developments

¶11 Readers approaching Section 1 for the first time should begin with **TG-1.0 Ocean Accounting and the Blue/Ocean Economy**, the framing circular for the section, which sets out the ocean economy terminology used throughout, what an ocean account can and cannot certify about a blue economy claim, and the map from a policy question to the circular that answers it. It is recommended reading, not a prerequisite.

¶12 ⓘ Framework Position

¶13 This Circular addresses how ocean accounts support project-level ocean finance by quantifying asset-level monetary flows, project contributions to social conditions, and ecosystem service returns on investment. In the Ocean Accounts Framework (TG-0.1 Figure 0.1.2):

Edge	Direction	Description
E3	FG1 ↔ SG1	Monetary flows between assets and economic sectors
E5	FG1 → SG2	Economic contributions to social conditions
E9	SG3 → FG1	Ecosystem services to economy

3. Guidance Material

3.1 Blue Bonds and Ocean-Linked Securities

¶1 Ocean-linked finance instruments differ in risk profile, tenor and the account inputs they require. Table 0 summarises the field; Sections 3.1 to 3.4 treat each instrument in turn.

¶2 Table 0: Ocean finance instruments and their account inputs

Instrument	Risk Profile	Typical Tenor	Key Account Inputs	Primary Outcome Metric
Blue bond	Low-medium	5-15 years	Monetary asset accounts, service flow accounts	Use-of-proceeds verification, KPI achievement
Parametric insurance	Event-driven	Annual renewal	Condition accounts, service flow baselines	Trigger parameter exceedance
Blue carbon credit	Medium	20-30 years	Carbon stock accounts, extent accounts	Verified emission reductions (tCO ₂ e)
Blended finance	Varies by tranche	5-20 years	Full suite of accounts	Development impact indicators
Debt-for-nature swap	Sovereign	10-20 years	Extent accounts, condition accounts	Conservation commitment compliance

¶3 **Parametric insurance.** Parametric (or index-based) insurance instruments provide rapid payouts when predefined environmental parameters are triggered, without requiring traditional loss assessment. For ocean contexts, parametric insurance can cover coral reef damage from hurricanes (with payouts triggered by storm intensity thresholds), fisheries losses from harmful algal blooms (triggered by chlorophyll concentration), or coastal flood damage (triggered by sea level or storm surge measurements). Ocean Accounts contribute to parametric insurance design by:

- ¶4 Providing historical baseline data on ecosystem condition that informs the selection of trigger parameters
- ¶5 Quantifying the economic value of ecosystem services at risk, which determines appropriate coverage levels
- ¶6 Documenting the relationship between ecosystem condition changes and economic losses through supply and use table analysis
- ¶7 Supporting post-event assessment of ecosystem recovery using time-series condition accounts

¶8 **Blended finance structures.** Blended finance uses catalytic capital from public or philanthropic sources to mobilise additional private capital for sustainable development. In ocean contexts, blended finance structures typically involve concessional debt or first-loss guarantees from MDBs or philanthropic foundations, combined with commercial investment from private investors. Ocean Accounts support blended finance by providing the common evidence base that all parties in the capital stack can reference: concessional providers use account data to justify the development rationale, whilst commercial investors use the same data for risk assessment and return estimation.

¶9 Blue bonds are debt instruments where proceeds are earmarked for ocean conservation, sustainable marine resource management, or ocean-based climate adaptation.⁸ Ocean Accounts provide the foundational information architecture needed to structure, monitor, and verify blue bond instruments.

¶10 Structuring Blue Bonds with Account Data

¶11 Ocean Accounts support blue bond structuring in several ways:

1. ¶12

Baseline establishment. Ecosystem extent and condition accounts establish pre-project baselines for marine natural capital assets such as mangroves, seagrass meadows, coral reefs, and fish stocks. These baselines are essential for defining conservation targets and measuring additionality.⁹

2. ¶13

Service quantification. Ecosystem service flow accounts quantify the value of services such as coastal protection, carbon sequestration, and fisheries production that blue bond proceeds aim

to protect or enhance. The SEEA EA provides internationally recognised methodologies for valuing these services using exchange value concepts consistent with national accounts.¹⁰

3. ¶14

Verifying use of proceeds. Physical supply and use tables track how marine resources and ecosystem services are used, supporting verification that bond proceeds support intended ocean-positive activities.

4. ¶15

Measuring outcomes. Time-series account data records changes in ecosystem extent, condition, and service delivery, providing the basis for impact reporting to bondholders and regulators.

¶16 Sustainability-Linked Bond Structures

¶17 Beyond use-of-proceeds bonds, Ocean Accounts support sustainability-linked bonds (SLBs) where bond characteristics such as coupon rates are tied to achieving pre-defined sustainability performance targets.¹¹ Account data can inform key performance indicators (KPIs) for ocean-linked SLBs, including:

- ¶18 Changes in marine protected area extent (from extent accounts)
- ¶19 Improvements in reef or mangrove ecosystem condition scores (from condition accounts)
- ¶20 Sustainable fisheries catch rates relative to maximum sustainable yield (from flow accounts)
- ¶21 Blue carbon sequestration rates (from carbon accounts)

¶22 In the Ocean Accounts Framework (TG-0.1), these project-level monetary flows correspond to Edge E3 (monetary flows between assets and economic sectors). The 2025 SNA recommends compilation of supplementary measures for sustainability-linked debt securities as “of which” items within the financial accounts framework, which facilitates monitoring of these instruments.¹² For the multilateral finance context of SLBs and the blue bond KPI framework, see **TG-1.7 OA and Multilateral Development Finance**, Section 3.6.

¶23 Blue Bond KPI-Account Mapping

¶24 **Table 1: Blue Bond KPI-Account Mapping**

KPI Category	Example KPI	Account Source	Measurement Frequency
Biodiversity	Coral cover (%)	Condition accounts	Annual
Water quality	Nutrient loading	Residual flow accounts	Quarterly
Carbon	Blue carbon sequestration	Carbon stock accounts	Annual
Livelihood	Fishing employment	Economic accounts	Annual

¶25 This mapping enables issuers to draw directly on compiled Ocean Accounts when preparing bondholder impact reports. For guidance on compiling the underlying condition and extent accounts referenced in Table 1, see **TG-3.1 Assets**.

3.2 Debt-for-Nature Swaps

¶1 Debt-for-nature swaps involve the restructuring of sovereign debt in exchange for commitments to conservation investments and outcomes. Ocean Accounts provide the technical foundation for quantifying conservation commitments, monitoring implementation, and verifying outcomes in marine debt swaps.

¶2 Quantifying Conservation Commitments

¶3 When structuring debt-for-nature swaps, parties must agree on the nature and scale of conservation commitments that justify debt relief. Ocean Accounts support this process by providing:

1. ¶4

Asset Valuation: Monetary ecosystem asset accounts estimate the present value of expected ecosystem service flows from marine natural capital.¹³ These valuations inform negotiations over the conservation value being exchanged for debt relief. For guidance on appropriate valuation methods, see **TG-1.9 Safe Usage of Monetary Valuation**.

2. ¶5

Spatial prioritisation: Spatially explicit extent and condition accounts help identify priority areas for conservation investment, so that debt swap proceeds target areas of highest ecological and economic value.

3. ¶6

Commitment Specificity: Account structures provide the precision needed to define specific, measurable, achievable, relevant, and time-bound (SMART) conservation commitments, such as protecting a defined area of mangroves or achieving specified improvements in reef condition scores.

¶7 Monitoring and Verification

¶8 Post-swap monitoring requires systematic tracking of conservation outcomes over time. Ocean Accounts provide:

- ¶9 **Physical Accounts:** Track changes in ecosystem extent (hectares of seagrass protected), condition (coral cover percentage), and flows (fish biomass sustained)
- ¶10 **Monetary Accounts:** Quantify the economic value of ecosystem services protected or restored, enabling comparison with the cost of debt relief
- ¶11 **Governance Accounts:** Document changes in protected area designation, management effectiveness, and enforcement capacity

¶12 Recent Debt-for-Nature Swap Experience

¶13 Recent debt-for-nature swaps demonstrate the growing scale and sophistication of these instruments, and the extent to which their design relies on systematic environmental data. The Seychelles debt-for-nature swap (completed 2015–2016) restructured approximately USD 21.6 million of sovereign debt in exchange for marine protected area commitments covering 30 per cent of the country's exclusive economic zone. Belize (2021) completed a debt conversion that retired USD 553 million of sovereign debt (repurchased at a discount) and refinanced through a USD 364 million blue bond, committing the country to expanding marine protection to 30 per cent of its ocean area and maintaining a marine conservation endowment fund. Ecuador (2023) executed the largest debt-for-nature swap to date, repurchasing approximately USD 1.6 billion (face value) of commercial bonds through a new USD 656 million loan, with conservation commitments for the Galapagos Islands marine reserve. In each case, the structuring and ongoing monitoring of conservation commitments relied on systematic spatial and biophysical data that Ocean Accounts produce: ecosystem extent baselines, condition indicators, and protected area management effectiveness metrics.

¶14 Example: Blue Carbon in Debt Swaps

¶15 Coastal and marine ecosystems including mangroves, seagrass meadows, and salt marshes store large quantities of carbon in biomass and sediments.¹⁴ Debt-for-nature swaps increasingly incorporate blue carbon commitments, where Ocean Accounts track:

- ¶16 Extent of blue carbon ecosystems protected (extent accounts)
- ¶17 Carbon stock density and sequestration rates (carbon accounts)
- ¶18 Avoided emissions from prevented ecosystem degradation (flow accounts)
- ¶19 Economic value of carbon storage services (monetary accounts)

¶20 For detailed methodology on blue carbon accounting, see **TG-6.2 Mangrove and Coastal Wetland Accounting** and **TG-6.3 Seagrass Ecosystem Accounting**.

3.3 Payments for Ecosystem Services

¶1 Payments for Ecosystem Services (PES) schemes create financial incentives for maintaining or enhancing ecosystem service provision. In marine and coastal contexts, PES schemes may target services including coastal protection, water quality regulation, fisheries habitat, and carbon sequestration.¹⁵ Ocean Accounts provide the measurement foundation for designing and operating effective ocean PES schemes.

¶2 Valuation Foundations for PES

¶3 The SEEA EA establishes a hierarchy of valuation methods appropriate for accounting purposes, with a preference for methods based on observable market prices or revealed preferences.¹⁶ For ocean PES schemes, relevant valuation approaches include:

1. ¶4

Directly Observable Prices: Where ecosystem services are already traded in markets (e.g., recreational fishing licences, dive permits), observed prices provide exchange values for accounting and PES pricing.

2. ¶5

Resource Rent Methods: For provisioning services like fisheries, resource rent calculations estimate the ecosystem contribution to production by deducting labour, capital, and intermediate input costs from gross output value.¹⁷

3. ¶6

Replacement Cost Methods: For regulating services like coastal protection, replacement costs estimate what it would cost to provide equivalent protection through engineered infrastructure.¹⁸

4. ¶7

Productivity Change Methods: For supporting services that enhance economic production (e.g., nursery habitat supporting commercial fisheries), production function approaches estimate the marginal contribution of ecosystem inputs.¹⁹

¶8 For valuation methodology selection, see **TG-2.4 Environmental (including Ecosystem) Goods and Services** Section 3.10; **TG-1.9 Safe Usage of Monetary Valuation** covers whether and when to value at all.

¶9 Designing Account-Based PES Schemes

¶10 Ocean Accounts support PES scheme design by:

1. ¶11

Identifying Beneficiaries: Supply and use tables identify economic units that benefit from marine ecosystem services, informing who should pay for service provision.

2. ¶12

Quantifying Services: Physical ecosystem service flow accounts measure the quantity of services provided (e.g., tonnes of carbon sequestered, hectares of shoreline protected), informing payment amounts.

3. ¶13

Targeting Payments: Spatial accounts identify where ecosystem services are produced and consumed, enabling geographic targeting of payments to providers.

4. ¶14

Monitoring Outcomes: Time-series accounts track whether service provision is maintained or enhanced under PES schemes.

¶15 Limitations and Considerations

¶16 Account compilers should note that the SEEA EA cautions against using PES payment data directly to estimate ecosystem service prices in accounts (para 9.31). In practice, many PES payments

function as income support or restoration funding rather than as price signals for specific services, which further limits their direct use in accounting.²⁰

3.4 Carbon and Blue Carbon Finance

¶1 Blue carbon ecosystems, particularly mangroves, seagrass meadows, and tidal marshes, sequester carbon at higher rates per unit area than many terrestrial ecosystems. Kelp forests are also highly productive, whilst their role in long-term carbon sequestration remains under active investigation.²¹ Carbon finance mechanisms including voluntary carbon markets, compliance markets, and results-based climate finance increasingly target blue carbon. Ocean Accounts provide essential measurement infrastructure for blue carbon finance.

¶2 Account-Based Carbon Quantification

¶3 Carbon accounts within the Ocean Accounts framework measure:

1. ¶4

Carbon Stocks: Total carbon stored in ecosystem biomass and sediments, measured in tonnes of carbon per ecosystem type and location.

2. ¶5

Sequestration Flows: Annual carbon uptake and storage by blue carbon ecosystems, providing the basis for calculating annual carbon credits.

3. ¶6

Emission Flows: Carbon releases from ecosystem degradation or destruction, informing avoided deforestation/degradation (REDD+) style crediting approaches.

4. ¶7

Net Carbon Balance: The difference between sequestration and emissions, indicating whether an ecosystem is a net carbon sink or source.

¶8 Verification Requirements

¶9 Carbon credit issuance requires measurement, reporting, and verification (MRV). Ocean Accounts contribute to MRV by:

- ¶10 Establishing baselines against which additionality can be assessed
- ¶11 Providing standardised methodologies for carbon quantification aligned with IPCC guidelines
- ¶12 Enabling independent verification through transparent, replicable account compilation
- ¶13 Supporting permanence monitoring through time-series tracking of carbon stocks

¶14 When selecting a crediting standard, project developers should ensure that the chosen methodology aligns with the carbon quantification approaches used in the underlying Ocean Accounts. Several major voluntary carbon market standards have developed or are developing blue carbon methodologies, including the Verified Carbon Standard (VCS, administered by Verra), the Gold Standard, and the American Carbon Registry. These standards differ in their requirements for baseline setting, additionality demonstration, permanence buffers, and leakage assessment. Account compilers can support project developers by ensuring that the physical carbon stock and flow data compiled in Ocean Accounts are structured to meet the data requirements of the relevant crediting standard, whilst maintaining the methodological consistency needed for national-level reporting.

¶15 Integration with Ecosystem Service Accounts

¶16 Blue carbon ecosystems provide multiple ecosystem services beyond carbon sequestration, including coastal protection, fisheries habitat, and water quality regulation.²² Ocean Accounts enable integrated valuation across multiple services, informing decisions about:

- ¶17 Stacking carbon credits with payments for other services

- ¶18 Prioritising restoration investments based on total service value
 - ¶19 Avoiding perverse incentives that might optimise carbon at the expense of other services
- ¶20 For ecosystem-specific carbon accounting guidance, see **TG-6.2 Mangrove and Coastal Wetland Accounting**.

3.5 Disclosure and Verification Requirements

¶1 The mapping between ocean account outputs and the TNFD, IFRS S1 and CSRD disclosure requirements is set out in **TG-1.11 OA and the Private Sector** Section 3.3, which is the single owner of disclosure-framework mapping in this publication. Two requirements are specific to instrument-level finance and are stated here.

¶2 **Verification requires a method a third party can re-run.** Assurance of an impact claim rests on the underlying data being transparent, sourced, time-series consistent and spatially precise enough to tie to the project boundary. Accounts compiled to international statistical standards satisfy this in a way that bespoke project monitoring generally does not, which is the practical reason to build instrument KPIs on account definitions rather than on project-specific metrics.

¶3 **Covenant metrics must be defined against a compilation cycle, not a calendar.** An instrument that requires an annual condition figure from an account compiled triennially will breach on timing rather than on performance. KPIs should name the account, the table, the indicator and the compilation cycle they depend on, and the reporting schedule should be set to follow that cycle. Section 3.6 below sets out which account each instrument type draws on.

3.6 Downward Connections to Accounts, Indicators, and Data

¶1 Account Components Supporting Project Finance

¶2 Project finance instruments draw on multiple Ocean Account components:

¶3 **Ecosystem Condition Accounts:** Provide baseline and monitoring data for ecosystem health indicators referenced in bond covenants, PES agreements, and debt swap commitments. Condition indicators include species richness, structural complexity, water quality parameters, and functional state metrics. For methodology, see **TG-3.1 Assets**.

¶4 **Ecosystem Extent Accounts:** Track changes in spatial coverage of marine habitats resulting from conservation or restoration investments. Extent changes enable verification of protection commitments in debt-for-nature swaps and blue bonds. Spatial data should be compiled in formats compatible with project boundaries defined in finance agreements.

¶5 **Ecosystem Service Flow Accounts:** Quantify physical and monetary flows of provisioning, regulating, and cultural services. Service flow accounts provide the basis for valuing project benefits in cost-benefit analysis and for structuring PES payment schedules.

¶6 **Asset Accounts:** Record opening stocks, additions, reductions, and closing stocks of marine ecosystem assets. Asset accounts enable net present value calculations used in restoration project appraisal and in valuing conservation commitments for debt swaps.

¶7 Key Indicators for Project-Level Decisions

¶8 Table 2: Project Finance Indicators from Ocean Accounts

Indicator	Account Source	Application	Typical Unit
Mangrove extent baseline	Extent accounts	Debt swap commitment definition	Hectares
Coral condition trend	Condition accounts	Blue bond KPI monitoring	Index (0-1 or 0-100 depending on national convention)

Indicator	Account Source	Application	Typical Unit
Blue carbon sequestration rate	Carbon flow accounts	Carbon credit issuance	tCO ₂ e/year
Coastal protection value	Service flow accounts (monetary)	Restoration project CBA	Currency/year
Fishery resource rent	Provisioning service accounts	PES payment calculation	Currency/tonne
Tourist expenditure (marine)	Cultural service accounts	Tourism concession valuation	Currency/year
Water quality (nutrient load)	Residual flow accounts	Pollution control bond KPI	kg N, P/year

¶9 Data Requirements and Sources

¶10 Effective project-level application requires fit-for-purpose data at appropriate spatial and temporal resolution:

- ¶11
Spatial resolution: Project boundaries typically range from <1 km² (local restoration sites) to 10,000s km² (large marine protected areas). Account data should be compiled at Basic Spatial Unit (BSU) resolution that enables aggregation to project scales.
- ¶12
Temporal frequency: Finance instruments require baseline measurements (pre-project), implementation monitoring (annual or more frequent), and ex-post evaluation (typically 3–10 years post-project). Account compilation cycles should align with financing instrument reporting requirements.
- ¶13
Data sources: Combining remote sensing (for extent and some condition indicators), field surveys (for detailed biophysical parameters), administrative data (for economic activity and regulatory enforcement), and scientific studies (for service flow quantification and valuation coefficients).

3.7 Worked Example: Mangrove Restoration Project Cost-Benefit Analysis

¶1 This section presents a synthetic worked example demonstrating how Ocean Accounts data support cost-benefit analysis for a coastal mangrove restoration project. The example is entirely illustrative and uses simplified assumptions to demonstrate accounting logic. Actual project appraisals would draw on site-specific biophysical and economic data.

¶2 Project Context

¶3 A coastal state proposes to restore 200 hectares of degraded mangrove habitat in a coastal lagoon system. The restoration involves hydrological reconnection, seedling planting, and management of invasive species over a 5-year implementation period. Project costs are estimated at USD 3 million (capital costs) plus USD 200,000 per year (ongoing management) over a 20-year evaluation horizon.

¶4 Account-Based Baseline

¶5 Ocean Accounts provide pre-project baseline data:

Account Component	Baseline Condition	Source
Ecosystem extent	50 ha remnant mangrove (severely degraded); 150 ha former mangrove (mudflat/bare ground)	Extent accounts, BSU aggregation
Ecosystem condition	Condition index = 25/100 (severely degraded remnant); 0/100 (lost areas)	Condition accounts, field surveys

Account Component	Baseline Condition	Source
Carbon stocks	20 tC/ha in remnant (below reference of 150 tC/ha); 0 tC/ha in lost areas	Carbon accounts
Coastal protection service	Limited wave attenuation; property at risk from storm surge	Service flow accounts (physical)
Fisheries nursery service	Low juvenile fish density (10% of reference condition)	Service flow accounts (biological surveys)

¶6 Project Scenario: Ecosystem Changes

¶7 Post-restoration trajectory based on comparable restoration projects (Years 0–20):

Metric	Year 0 (Baseline)	Year 5	Year 10	Year 20 (Mature)
Restored extent	0 ha	180 ha	195 ha	200 ha
Condition index (restored area)	0	40	65	85
Carbon stock (restored area, tC/ha)	0	40	80	130
Fisheries nursery service (% reference)	10%	45%	70%	90%

¶8 Ecosystem Service Valuation

¶9 Using the methods in **TG-2.4 Environmental (including Ecosystem) Goods and Services** Section 3.10 and the SEEA Valuation Guidelines:

¶10 **Coastal Protection Service** (Avoided Damage Cost Method, Tier 5)

¶11 Mangrove restoration reduces flood risk to 150 coastal properties. Based on flood risk modelling, expected annual damages decline from USD 400,000 (baseline) to USD 100,000 (post-restoration). Annual benefit = USD 300,000/year (reached at Year 10; linear increase Years 0–10).

¶12 **Blue Carbon Sequestration** (Directly Observable Prices, Tier 1)

¶13 Restored mangroves sequester carbon at an average rate of 2.5 tC/ha/year over the 20-year horizon (an optimistic assumption reflecting productive restoration sites, whilst typical rates may be 1.0–2.5 tC/ha/year depending on species and site conditions). At 200 ha and a carbon price of USD 15/tCO₂e (voluntary market), annual carbon benefit = 200 ha × 2.5 tC/ha/yr × 3.67 tCO₂e/tC × USD 15/tCO₂e = USD 27,500/year (Years 5–20, zero Years 0–5 due to establishment lag).

¶14 **Fisheries Productivity Enhancement** (Productivity Change Method, Tier 3)

¶15 Production function analysis indicates that each 10% improvement in nursery habitat quality increases local fishery catch value by USD 25,000/year. From baseline (10%) to mature condition (90%), the fishery benefit reaches USD 200,000/year (linear increase over 20 years).

¶16 Cost-Benefit Analysis Results

¶17 **Table 3: Project CBA Summary (20-year horizon, 4% discount rate)**

Item	Total (NPV, USD millions)	Annualised (USD/year)
Costs		
Capital costs (Years 0–5)	3.00	–
Management costs (Years 0–20)	2.72	200,000
Total Costs	5.72	–
Benefits		
Coastal protection (avoided damages)	2.90	300,000
Blue carbon revenue	0.25	27,500
Fisheries productivity	1.25	200,000

Item	Total (NPV, USD millions)	Annualised (USD/year)
Total Benefits	4.41	–
Net Present Value	-1.31	–
Benefit–Cost Ratio	0.77	–

¶18 Interpretation

¶19 On the benefit streams stated above, the NPV is negative (–USD 1.3 million) and the benefit–cost ratio is 0.77: the monetised benefits do not cover the costs over the 20-year horizon. This is not unusual for ecosystem restoration, where non-monetised co-benefits (biodiversity, cultural services, resilience) are material but not captured in exchange-value-based CBA, but it means the monetised result alone does not establish that the project is economically viable.

¶20 ⓘ **Corrected 24 September 2026**

¶21 Table 3 previously reported an NPV of +USD 0.5 million and a benefit–cost ratio of 1.09, which the stated benefit streams do not reproduce; discounted at 4% they give an NPV of –USD 1.3 million, so the table, this interpretation and the sensitivity results have been recomputed.

¶22 Sensitivity to Valuation Assumptions

¶23 Project viability is sensitive to key assumptions. Sensitivity results reflect re-discounting all benefit and cost streams at the alternative rate:

- ¶24 **Discount rate:** At 3% (lower rate reflecting long-term social preference), NPV improves to –USD 1.0 million. At 6% (higher rate), NPV falls to –USD 1.8 million. The NPV is negative at all three rates.
- ¶25 **Carbon price:** At USD 30/tCO₂e (premium voluntary market), carbon benefit doubles to USD 0.5 million, increasing BCR to 0.81.
- ¶26 **Coastal protection:** If storm surge damages are underestimated and true baseline risk is USD 600,000/year, coastal protection benefit increases to USD 4.4 million, yielding NPV of USD 0.1 million.

¶27 Account Integration

¶28 This CBA draws entirely on Ocean Accounts components:

- ¶29 Extent and condition baselines establish the “no action” counterfactual.
- ¶30 Carbon accounts provide sequestration rates consistent with IPCC methodologies.
- ¶31 Service flow accounts (coastal protection, fisheries nursery) provide the physical and monetary valuation basis.
- ¶32 Spatial accounts enable allocation of benefits to specific beneficiary groups (coastal property owners, fishing communities).

¶33 Project developers preparing finance proposals for multilateral development banks or impact investors can reference this account-based CBA structure to demonstrate alignment with international statistical standards whilst meeting MDB economic analysis requirements described in **TG-1.7 OA and Multilateral Development Finance**.

3.8 Application Procedure for Project Developers

¶1 **Step 1: Define Project Scope and Boundaries**

¶2 Identify the geographic extent, temporal horizon, and intended outcomes of the financed activity:

- ¶3 Map project boundaries to Ocean Accounts spatial units (Basic Spatial Units or aggregated zones)
- ¶4 Specify project timeline (implementation period, monitoring duration, benefit accrual period)

- ¶5 List intended conservation, restoration, or sustainable use outcomes in measurable terms

¶6 **Step 2: Establish Account-Based Baselines**

¶7 Extract pre-project baseline data from Ocean Accounts or compile project-specific accounts:

- ¶8 Ecosystem extent and condition for relevant habitat types (mangroves, seagrass, coral reefs, etc.)
- ¶9 Current ecosystem service flows (provisioning, regulating, cultural services)
- ¶10 Economic activity levels (fisheries extraction, tourism, coastal development)
- ¶11 Carbon stocks and sequestration rates (for blue carbon projects)

¶12 Consult **TG-3.1 Assets** for extent and condition account methodology and relevant ecosystem-specific circulars (e.g., **TG-6.2 Mangrove and Coastal Wetland Accounting**) for detailed measurement guidance.

¶13 **Step 3: Define Counterfactual and Project Scenarios**

¶14 Develop “without project” and “with project” scenarios:

- ¶15 **Counterfactual (baseline)**: Project ecosystem trajectories under business-as-usual (e.g., continued degradation, stable but low condition, regulatory-driven slow improvement)
- ¶16 **Project scenario**: Project ecosystem trajectories with intervention (e.g., extent increase from restoration, condition improvement from management, service flow enhancement)

¶17 Scenario development should be grounded in scientific evidence from comparable projects and ecological understanding of recovery trajectories.

¶18 **Step 4: Value Ecosystem Service Changes**

¶19 Apply the valuation methods in **TG-2.4 Environmental (including Ecosystem) Goods and Services** Section 3.10 to quantify project benefits:

- ¶20 Identify ecosystem services affected by the project (e.g., coastal protection, carbon sequestration, fisheries habitat)
- ¶21 Select appropriate valuation methods following the SEEA preference order (directly observable prices > resource rent > replacement cost > avoided damage)
- ¶22 Calculate annual ecosystem service values under counterfactual and project scenarios
- ¶23 Compute incremental benefits as the difference between scenarios

¶24 For project-level cost-benefit analysis submitted to multilateral development banks, supplement exchange values from accounts with welfare values as described in **TG-1.7 OA and Multilateral Development Finance** Section 3.2.

¶25 **Step 5: Structure Finance Instrument**

¶26 Design the finance instrument drawing on account data:

¶27 For **blue bonds**:

- ¶28 Define KPIs linked to account indicators (e.g., extent protected, condition index change, service flow targets)
- ¶29 Establish KPI measurement protocols consistent with account compilation cycles
- ¶30 Specify reporting frequency and verification mechanisms

¶31 For **debt-for-nature swaps**:

- ¶32 Quantify conservation commitments using monetary ecosystem asset accounts (NPV of service flows)
- ¶33 Translate commitments into SMART targets (e.g., “protect 10,000 hectares of mangrove with condition index >60 by Year 5”)
- ¶34 Define monitoring frameworks using account structures

¶35 For **PES schemes**:

- ¶36 Identify service beneficiaries using supply and use table structures
- ¶37 Set payment levels based on ecosystem service values from accounts
- ¶38 Design payment triggers linked to account-measurable outcomes (extent maintained, condition improved, service delivery verified)

¶39 **Step 6: Establish Monitoring and Reporting Framework**

¶40 Align project monitoring with Ocean Accounts compilation:

- ¶41 Schedule monitoring activities to coincide with national account compilation cycles where feasible
- ¶42 Use consistent methodologies for extent, condition, and service flow measurement
- ¶43 Adopt spatial data formats compatible with national Ocean Accounts (enable aggregation of project data into national totals)
- ¶44 Prepare for third-party verification by documenting data sources, methods, and quality indicators

¶45 **Step 7: Prepare Disclosure Documents**

¶46 Prepare project disclosure materials aligned with TNFD and IFRS standards:

- ¶47 Location disclosure: Map project area in relation to priority biomes and protected areas
- ¶48 Dependency disclosure: Identify and quantify project dependencies on marine ecosystem services using supply and use table logic
- ¶49 Impact disclosure: Quantify positive impacts (ecosystem extent increase, condition improvement) using account metrics
- ¶50 Target disclosure: Specify quantitative targets for ecosystem outcomes using account-derived indicators

¶51 Consult TNFD sector guidance for ocean industries to identify sector-specific disclosure metrics relevant to the project.

3.9 From ground-level projects to investor due diligence

¶1 A persistent challenge in ocean finance is the gap between ground-level project development and the information requirements of institutional investors. Ocean Accounts bridge this gap by providing a common measurement framework across project stages.

¶2 **Pipeline development.** The project pipeline for ocean finance typically follows a progression from concept to bankability:

1. ¶3

Concept stage: Ocean Accounts establish the baseline extent and condition of the target ecosystem and quantify the ecosystem services at stake.

2. ¶4

Feasibility stage: cost-benefit analysis draws on monetary valuations of ecosystem services, physical flow data for carbon sequestration estimates, and economic activity data for employment and livelihood projections.

3. ¶5

Preparation stage: the impact indicators embedded in financial covenants, the monitoring framework that will verify outcomes, and the baseline data against which performance will be measured all come from compiled accounts.

4. ¶6

Transaction stage: account data are referenced in offering documents, prospectuses, or loan agreements. The readiness diagnostic in **TG-0.8 Implementation Readiness Assessment** Section 3.8 can be used to confirm that the evidence base meets investor requirements.

¶7 **Bankability assessment.** Financial institutions assess bankability against criteria that differ somewhat from development effectiveness criteria. Ocean Accounts contribute to bankability by:

- ¶8 Providing auditable baseline data that reduces information asymmetry between project developers and investors
- ¶9 Enabling standardised risk assessment through time-series condition and extent data
- ¶10 Supporting revenue projections for ecosystem service-based revenue streams (e.g., carbon credits, tourism fees, fisheries royalties) using physical and monetary supply and use tables
- ¶11 Creating a monitoring infrastructure that reduces the cost of ongoing investor oversight

¶12 **Aggregation for scale.** Individual ocean projects are often too small to attract institutional investment directly. Ocean Accounts facilitate aggregation by providing a common measurement framework across projects: when all projects in a bundle use the same accounting classifications, spatial definitions, and reporting formats, the aggregated portfolio can be assessed and monitored using consolidated account data.

¶13 **The role of intermediaries.** Project preparation facilities, conservation finance intermediaries, and national development banks can use Ocean Accounts as a quality standard, requiring that projects in their pipeline compile specified account types before proceeding to transaction stage. This approach ensures consistent evidence quality across the pipeline and reduces the risk of project failure due to inadequate environmental data.

4. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

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DRAFT

Safe Usage of Monetary Valuation

Explains monetary valuation of ocean ecosystem services and assets – one of the most powerful yet most frequently misapplied parts of ocean accounting.

Version 0.8.1

Status Draft

Stability Core

Last updated September 2026 **Responsible officer** Dr Jordan Gacutan

Drafting AI-assisted drafting from GOAP Secretariat source materials; source list to be published at the close of consultation.

OUTCOME

Monetary valuation is one of the most powerful and most often misused outputs of ocean accounting. Applied appropriately, monetary values allow ecosystem services and assets to be compared with standard economic measures, inform policy trade-offs, and contribute to extended measures of national wealth. Applied inappropriately, they undermine the credibility of the accounts and support conclusions the evidence does not carry.

This Circular is about whether and when to value, and how to present the result. It does not specify valuation methods: the preference order, the methods at each level, the methods inadmissible in accounts and the worked application are set out in [TG-2.4 Environmental \(including Ecosystem\) Goods and Services](#) Section 3.10, with asset-level net present value in [TG-3.1 Asset Accounts](#) Sections 3.3 and 3.5.3.

After reading it, a decision-maker or compiler should be able to answer four questions. Should this question be answered with a monetary figure at all, or do physical accounts already settle it (Sections 3.1 and 3.2)? What kind of value is this figure – an exchange value from the accounts, or a welfare value from a cost-benefit study – and can the two be placed in the same total (Section 3.3)? How much weight will it bear, given the preference level of the method behind it and whether inadmissible methods have been folded in (Section 3.4)? And how must it be presented so that it is not read as the total value of the ecosystem, as a licence to trade the ecosystem away, or as more precise than it is (Section 3.5)?

Monetary values from accounts will not fully reflect the importance of ecosystems for people and the economy. Physical accounts should always be compiled and released alongside them.

CONTENTS

1. Outcome	3
2. Requirements	3
3. Guidance Material	3
3.1 When Monetary Valuation Should Be Applied	3
3.2 When Monetary Valuation Should Not Be Applied	5
3.3 What the accounts can and cannot tell you	6
3.4 Method selection: what to ask, and where the method is specified	7
3.5 Communication and Transparency	8
4. Acknowledgements	9
5. References	9

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DRAFT

1. Outcome

¶1 Monetary valuation is one of the most powerful and most often misused outputs of ocean accounting. Applied appropriately, monetary values allow ecosystem services and assets to be compared with standard economic measures, inform policy trade-offs, and contribute to extended measures of national wealth.¹ Applied inappropriately, they undermine the credibility of the accounts and support conclusions the evidence does not carry.²

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¶4 Monetary values from accounts will not fully reflect the importance of ecosystems for people and the economy.³ Physical accounts should always be compiled and released alongside them.

2. Requirements

- ¶1 **TG-0.1 General Introduction** – Understanding of the GOAP framework and ocean accounting fundamentals

¶2 **Related Circulars:**

- ¶3 **TG-0.2 Overview of Relevant Statistical Standards** – Statistical classifications and standards
- ¶4 **TG-3.1 Marine Ecosystem Asset Accounts** – Physical and monetary asset accounts that apply valuation
- ¶5 **TG-3.2 Flows from Environment to Economy** – Ecosystem service accounts that require valuation

¶6 Readers approaching Section 1 for the first time should begin with **TG-1.0 Ocean Accounting and the Blue/Ocean Economy**, the framing circular for the section, which sets out the ocean economy terminology used throughout, what an ocean account can and cannot certify about a blue economy claim, and the map from a policy question to the circular that answers it. It is recommended reading, not a prerequisite.

3. Guidance Material

3.1 When Monetary Valuation Should Be Applied

¶1 Monetary valuation of ocean ecosystem services and assets is appropriate and valuable in specific decision contexts where monetary comparison provides necessary information.

3.1.1 Integration with National Accounts

¶1 Exchange-value-based monetary accounts support the applications summarised in Table 3.1.1 below⁴.

¶2 **Table 3.1.1: Applications supported by exchange-value-based monetary accounts**

Application	Description
Extended national wealth measures	Comparing values of marine ecosystem assets with other asset types (produced assets, financial assets).
Visibility of ocean contributions	Highlighting the economic relevance of non-market ocean services in a common unit of account.
Supply chain analysis	Assessing ecosystem inputs to blue economy industries (fisheries, aquaculture, tourism, shipping).
Trade-off analysis	Comparing relative exchange values of different ecosystem services to inform allocation decisions.
Adjusted income measures	Deriving degradation-adjusted measures (e.g., net national income less ocean ecosystem degradation).

3.1.2 Ecosystem Asset Valuation

¶1 The net present value approach to ecosystem asset valuation, using the discounted present value of expected future ecosystem service flows, provides a basis for:⁵

- ¶2 Recording opening and closing values of marine ecosystem assets in monetary balance sheets
- ¶3 Measuring ocean ecosystem degradation and enhancement in monetary terms
- ¶4 Tracking changes in marine natural capital wealth over time
- ¶5 Comparing ecosystem asset values across different ocean realms and ecosystem types

¶6 The selection of an appropriate discount rate determines the resulting asset value. The SEEA EA provides a dual framing for discount rate selection: individual market-based discount rates should be applied for ecosystem services whose users are private economic units, whilst social discount rates should be applied for ecosystem services that contribute to collective benefits received by groups of people or society generally (SEEA EA, para. 10.77). For ocean accounting, where many services such as coastal protection and carbon sequestration provide collective benefits, social discount rates may be more appropriate for a large share of the service portfolio. Para 10.78 further notes that social discount rates should be based on rates in active use in government decision-making, or long-term government bond rates where such rates are not available.⁶

¶7 In practice, different discount rates can produce widely divergent asset values for long-lived marine ecosystems, particularly for services such as carbon sequestration and coastal protection where benefits accrue over decades or centuries. Compilers should conduct sensitivity analysis to assess the effect of alternative discount rates on asset values and document the chosen rate and its rationale transparently. The SEEA EA does not prescribe a single rate but encourages consistency within and across accounts.

¶8 Where a country has no published social discount rate and no active long-term government bond market, a situation common among small island developing states (SIDS) and many coastal developing countries, compilers should apply the following fallback approach: (a) use a regional average social discount rate from the relevant regional development bank (e.g., the Asian Development Bank, Inter-American Development Bank, or African Development Bank) as the first option; (b) if no regional rate is available, apply 3% as a conservative international benchmark consistent with IPCC AR6 Working Group III Chapter 3 and the commonly applied lower-bound social rate in climate economics literature, with explicit justification; (c) in all cases, conduct sensitivity analysis spanning at least three rates across a plausible range (e.g., 2%, 4%, 7%) and report results for each. See TG-3.1 for further treatment in the context of asset accounts.⁷

3.1.3 Blue Economy Policy Analysis

¶1 Monetary values from ocean accounts can provide baseline data to support:

- ¶2 Scenario modelling of alternative ocean use patterns
- ¶3 Assessment of climate-related financial risks to ocean-dependent sectors
- ¶4 Design and calibration of marine environmental policy instruments (e.g., marine spatial planning, pollution charges, payment for ecosystem services schemes)
- ¶5 Evaluation of blue economy investment opportunities⁸

3.1.4 Ocean-Specific Applications

¶1 For ocean accounting specifically, monetary valuation is particularly valuable for:

Application	Value Added by Monetary Valuation
Fisheries management	Resource rent trends signal sustainability; depletion costs inform net income measures
Marine protected areas	Cost-benefit framing for protection decisions; ecosystem service value demonstrates returns on conservation investment
Coastal development	Quantifying trade-offs between development revenues and lost ecosystem services
Blue carbon markets	Integration with carbon markets and climate policy; exchange values for carbon credits
Maritime spatial planning	Common metric for multi-use trade-off analysis across fishing, shipping, energy, conservation

3.2 When Monetary Valuation Should Not Be Applied

¶1 Monetary valuation should not be pursued, or should be approached with caution, in the circumstances set out below.

3.2.1 Physical Accounts Are Sufficient

¶1 For many policy questions, physical accounts on ecosystem extent, condition, and service flows provide sufficient information without requiring monetary valuation. Physical accounts may be preferred when:⁹

- ¶2 The policy question relates to biophysical thresholds (e.g., maximum sustainable yield, critical habitat area, water quality standards)
- ¶3 Stakeholders have legitimate concerns about commodification of marine ecosystems
- ¶4 Data and capacity constraints make reliable monetary valuation infeasible
- ¶5 Primary users require physical metrics for environmental management (e.g., tonnes of carbon, hectares of habitat, population abundance)

¶6 **Recommendation:** Always compile and publish physical accounts. Consider monetary valuation as a complement, not a replacement, for physical measurement.

3.2.2 Data Quality Concerns

¶1 Monetary valuation should be approached cautiously when:¹⁰

- ¶2 Underlying physical data (extent, condition, service flows) are of insufficient quality or uncertain
- ¶3 Available valuation methods require assumptions that cannot be validated from observed data
- ¶4 The uncertainty range in monetary estimates is so large as to undermine decision-usefulness
- ¶5 Value transfer from other contexts involves 'institutional mismatch' (different regulatory or property rights regimes) or 'ecological mismatch' (different ecosystem characteristics)

¶6 In such cases, it may be preferable to:

- ¶7 Present ranges rather than point estimates, with explicit documentation of uncertainty
- ¶8 Clearly document methods, assumptions, and data quality limitations
- ¶9 Focus resources on improving physical data before attempting valuation
- ¶10 Use qualitative assessments alongside limited monetary data

3.2.3 Risk of Misinterpretation

¶1 Special care is needed to avoid situations where monetary values may be misinterpreted. Monetary values from accounts:¹¹

- ¶2 **Do not represent** the 'true' or 'total' value of ocean ecosystems (they measure exchange value, not total welfare)
- ¶3 **Do not justify** ecosystem destruction if monetary 'compensation' is paid (non-substitutability and irreversibility matter)
- ¶4 **Do not capture** all relevant considerations for decision-making (cultural values, equity, rights, and biodiversity intrinsic value)
- ¶5 **Are not precise** even when presented as single numbers (they reflect estimation assumptions and uncertainty)

¶6 Clear communication (see Section 3.5) is essential to manage these risks. Compilers should make explicit the limitations of monetary values and the complementary information required for sound decision-making.

3.2.4 Inappropriate Aggregation

¶1 Caution is required when aggregating monetary values across:¹²

- ¶2 **Multiple ecosystem services:** Risk of double-counting (e.g., water flow regulation and water supply may overlap; nursery habitat services and fish provisioning services have an intermediate-final service relationship)
- ¶3 **Different time periods:** Requires appropriate discounting and adjustment for price changes; nominal values from different years are not directly comparable
- ¶4 **Spatial units:** Different institutional contexts (e.g., open-access versus managed access fisheries) may make aggregation misleading
- ¶5 **Different methods:** Mixing values from methods with different uncertainty characteristics (e.g., observed prices versus simulated exchange values) requires careful documentation and sensitivity analysis

¶6 **Decision rule – nursery services and resource rent:** When the resource rent method is used to value fish provisioning services, nursery habitat services (e.g., coral reef or mangrove nursery function) must not be separately valued in the same account. The resource rent is a residual that already captures the combined contribution of all ecosystem inputs to the fishery, including nursery function. Valuing nursery services separately alongside resource rent would double-count that contribution. Separate valuation of nursery services is appropriate only when an alternative method (such as the productivity change method) is used and is explicitly specified to exclude the nursery contribution from the production function. This rule applies at the level of a single accounting area; compilers should cross-check it when populating service rows in monetary supply and use tables. See also **TG-2.4** Section 3.10.6.

3.3 What the accounts can and cannot tell you

¶1 Two properties of accounting values govern every use in Sections 3.1 and 3.2, and a decision-maker who does not hold them will misread the figures.

¶2 **The accounts record exchange values, not welfare values.** An exchange value is what a good, service or asset is or could be exchanged for in cash. A welfare value adds consumer surplus – the difference between what people would have been willing to pay and what they actually paid. Cost-benefit analysis conventionally uses welfare values; the accounts do not, because consumer surplus is not transferred between parties and cannot be reconciled with GDP or national wealth. The practical consequence is that account values are systematically *lower* than the welfare values a cost-benefit analysis would use for the same service, and the two must never be mixed in one total or one comparison without an explicit bridge.

¶3 **The valuation guidance is recommendation, not adopted standard.** The UN Statistical Commission adopted SEEA EA chapters 1–7, the physical accounting framework, as an international statistical standard in March 2021. It recognised chapters 8–11, which cover valuation, as “internationally recognized statistical principles and recommendations” for countries choosing to undertake valuation.¹³ The distinction was deliberate: valuation methods had not reached the methodological maturity of the physical framework. Countries are therefore encouraged but not required to value, and monetary figures should be presented on that footing.

¶4 Both points, together with the SNA production boundary that determines which services can be valued at all, are set out in full in **TG-2.4 Environmental (including Ecosystem) Goods and Services** Section 3.10.1.

3.4 Method selection: what to ask, and where the method is specified

¶1 Method selection is a compilation decision, specified in **TG-2.4** Section 3.10 and, for asset-level valuation, **TG-3.1 Asset Accounts** Sections 3.3 and 3.5.3. What a decision-maker needs is the shape of the preference order, because it determines how much weight a figure will bear.

¶2 The SEEA EA ranks methods by their proximity to observed market transactions:

Level	Basis	Marine examples	How much weight it bears
1	Directly observable prices	Fish quota (ITQ) prices, verified carbon credit prices, aquaculture lease fees	Highest. Defensible in a contested process
2	Prices from markets for similar goods	Fish prices from comparable fisheries, rents from comparable coastal sites	High, subject to a documented comparability assessment
3	Prices embodied in market transactions	Fisheries resource rent, hedonic coastal property premiums, productivity change for nursery services	Moderate. The residual is sensitive to the cost assumptions deducted
4	Prices from revealed expenditures	Averting behaviour where the expenditure was actually incurred; travel expenditure	Lower. Requires an expenditure record, not a plausible future cost
5	Prices from expected or simulated expenditures	Replacement cost for an unbuilt structure, avoided damage cost from modelled scenarios, simulated exchange value	Lowest. Present with sensitivity analysis, never as a point estimate

¶3 Three questions follow for anyone commissioning or citing a monetary figure.

¶4 **At what level was each service valued?** A total that aggregates a level 1 carbon price with a level 5 modelled coastal protection estimate carries the uncertainty of its weakest component, not its strongest. Ask for the level by service, not for the total alone.

¶5 **Is a cost-based figure backed by an actual expenditure?** The distinction between level 4 and level 5 turns on whether the defensive or replacement expenditure has been made and recorded. A seawall that has been built and paid for is evidence; a seawall that would notionally be needed is a model. Both are legitimate, but only one survives audit.

¶6 **Were any inadmissible methods used?** Consumer surplus measures, directly applied stated preference results, non-use values and whole-ecosystem restoration costs do not yield exchange values and are not admissible as account entries. They remain valuable for wider policy analysis and can be presented in complementary accounts and bridge tables – but a figure described as coming “from the ocean accounts” should not contain them.

3.5 Communication and Transparency

3.5.1 Key messages to communicate

¶1 When presenting monetary values from ocean accounts, compilers should communicate the key messages summarised in Table 3.5.1 below¹⁴.

¶2 **Table 3.5.1: Key messages to communicate alongside monetary values**

Message	Description
Valuation concept	Monetary values are based on exchange values consistent with national accounting concepts – they represent what ecosystem services would be exchanged for, not their total economic value or welfare value.
Complementarity	Monetary values should be interpreted alongside physical data on ecosystem extent, condition, and service flows.
Uncertainty	All monetary estimates involve uncertainty, which should be acknowledged and where possible quantified.
Institutional context	Values reflect current institutional arrangements (property rights, regulations, markets) which may understate long-term importance.
Limitations	Monetary values do not capture non-use values, and low monetary values do not mean ecosystems are unimportant.

3.5.2 Documentation requirements

¶1 Transparent documentation should include the elements summarised in Table 3.5.2 below¹⁵.

¶2 **Table 3.5.2: Elements of transparent valuation documentation**

Element	Description
Methods	Clear description of valuation methods used for each ecosystem service and asset category.
Data sources	Description of primary data sources and their quality.
Key assumptions	Explicit statement of assumptions, particularly regarding discount rates, time horizons, and future projections.
Sensitivity analysis	Assessment of how results change with alternative assumptions.
Method comparison	Where feasible, comparison of results using alternative methods.
Uncertainty ranges	Presentation of ranges or confidence intervals where possible.
Version and vintage	Record the version of the valuation model and the vintage (reference year) of all input datasets (e.g., fish stock survey year, extent map edition, carbon price series), and document whether changes in monetary values between editions reflect methodological revisions, data updates, or both. This is particularly important for time-series comparisons used to infer trends in natural capital wealth. ¹⁶

3.5.3 Presentation guidance

¶1 **Do:**

- ¶2 Present monetary values alongside physical quantities and condition indicators
- ¶3 Show time series to reveal trends
- ¶4 Disaggregate by ecosystem type and service to reveal composition

- ¶5 Explain what is and is not included in the estimates

¶6 **Do not:**

- ¶7 Present aggregate 'total value of the ocean' figures without extensive caveats
- ¶8 Compare monetary values across studies using different methods without adjustment
- ¶9 Use monetary values as sole basis for decisions about ecosystem protection
- ¶10 Imply that monetary compensation can adequately substitute for ecosystem loss

4. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

5. References

1. ¶1 SEEA EA 2021, para. 8.3. Exchange value based monetary accounts support multiple applications including comparing asset values, highlighting non-market services, assessing ecosystem contributions to production, comparing trade-offs, and deriving adjusted aggregates.
2. ¶2 SEEA EA 2021, para. 8.4. Monetary valuation will not be appropriate in all decision-making contexts and associated biophysical data should always be considered alongside monetary values.
3. ¶3 SEEA EA 2021, para. 1.15. Monetary values will not fully reflect ecosystem importance; assessing importance requires consideration of biophysical characteristics, ecosystem condition, and characteristics of dependent communities.
4. ¶4 SEEA EA 2021, para. 8.3. Exchange value based monetary accounts support multiple applications including comparing asset values, highlighting non-market services, assessing ecosystem contributions to production, comparing trade-offs, and deriving adjusted aggregates.
5. ¶5 SEEA EA 2021, paras 10.44-10.51. The NPV approach to ecosystem asset valuation uses the discounted present value of expected future ecosystem service flows.
6. ¶6 SEEA EA 2021, paras 10.76-10.81. The SEEA EA recommends market-based discount rates for services used by private economic units and social discount rates for services providing collective benefits, with sensitivity analysis and transparent documentation of the chosen rate.
7. ¶7 SEEA EA 2021, paras 10.76-10.81; NCAVES/MAIA 2022, Section 3.3; IPCC AR6 Working Group III, Chapter 3. For the 3% benchmark, see IPCC AR6 WG3 Chapter 3 (2022), which uses 3% as an illustrative social discount rate in scenario analyses; the commonly applied lower-bound range in climate economics literature spans approximately 1.4-3%.
8. ¶8 SEEA EA 2021, para. 8.3. Monetary accounts support scenario modelling, risk assessment, and policy instrument calibration.
9. ¶9 SEEA EA 2021, para. 8.5. Physical accounts may be sufficient for many policy questions; monetary valuation not always necessary.
0. ¶10 NCAVES/MAIA 2022, Section 6.3. Discusses fitness for purpose and data quality considerations.
1. ¶11 NCAVES/MAIA 2022, Section 6.5. Recommendations for communicating monetary values to avoid misinterpretation.
2. ¶12 NCAVES/MAIA 2022, Section 6.4. Discusses aggregation issues across services, regions, and time.
3. ¶13 UNSC Decision 52/101, March 2021. The Statistical Commission adopted chapters 1-7 as international statistical standard, recognized chapters 8-11 as internationally recognized statistical principles and recommendations, and noted chapters 12-14 as applications and extensions.
4. ¶14 NCAVES/MAIA 2022, Section 6.5. Recommendations for clear communication of monetary values.
5. ¶15 SEEA EA 2021, para. 10.81. Compilers encouraged to undertake sensitivity assessments and publish documentation.
6. ¶16 SEEA EA 2021, paras 11.3-11.5. Time series consistency requires distinguishing methodological revisions from data vintage updates; version and vintage disclosure enables readers to interpret changes between account editions correctly.

OA and National Planning Integration

Helps planning officials design the inter-ministerial coordination arrangements needed to embed ocean account outputs into national development plans.

Version 0.8.2

Status Draft

Stability Applied

Last updated September 2026 **Responsible officer** Dr Jordan Gacutan

Drafting AI-assisted drafting from GOAP Secretariat source materials; source list to be published at the close of consultation.

OUTCOME

After reading this Circular, planning officials will be able to get ocean account outputs into national development plans, blue economy strategies and international reporting on time and in a usable form. Its subject is the flow of outputs into the planning cycle: which output a planning authority needs at each entry point, in what form, and by when.

Section 3.1 sets out the entry points – situation analysis, priority setting, target setting in a blue economy strategy, and monitoring and evaluation – and Section 3.2 states what each requires and the three failure modes that recur: the output arrives after the decision, the output is a table when it needed to be a finding, and targets are set in terms no account can verify. Section 3.3 covers international reporting architectures from the planning-integration side, where the case for the compilation budget is usually made.

The institutional arrangements that produce the accounts are outside this Circular. Coordination models, champions and regional platforms are treated in [TG-0.8 Implementation Readiness Assessment](#) Sections 3.5 and 3.9; data-sharing agreements, technical working groups and platform design in [TG-4.7 National Data Coordination Architectures](#); and how governance arrangements are themselves measured and recorded in [TG-3.7 Governance Accounts](#). Indicator derivation for SDG, GBF and climate reporting is [TG-2.10 Multilateral Environmental Agreement Indicators](#).

Ocean accounts generate outputs that cut across the mandates of multiple agencies. SEEA EA Chapter 13 notes that an “integrated and standardized set of accounts” can support balanced decisions across social, environmental and economic dimensions. That integration does not happen automatically, and it does not happen at all if the output reaches the planning authority after the plan is written.

CONTENTS

1. Outcome	3
2. Requirements	3
3. Guidance Material	4
3.1 Embedding OA Outputs in National Development Plans	4
3.2 Getting account outputs to the planning authority on time	6
3.3 International Reporting Architectures	7
4. Acknowledgements	7
5. References	7

ABOUT THIS CIRCULAR

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DRAFT

¶1 ⓘ Framework Position

¶2 This Circular addresses the governance design that connects ocean accounting outputs to national planning processes. In the Ocean Accounts Framework (TG-0.1 Figure 0.1.2):

Edge	Direction	Description
E7	SG2 → FG1	Social assets (governance frameworks) enabling economic flows
E8	SG2 → FG2	Social assets (governance arrangements) enabling social activities

1. Outcome

¶1 After reading this Circular, planning officials will be able to get ocean account outputs into national development plans, blue economy strategies and international reporting on time and in a usable form. Its subject is the flow of outputs into the planning cycle: which output a planning authority needs at each entry point, in what form, and by when.

¶2 Section 3.1 sets out the entry points – situation analysis, priority setting, target setting in a blue economy strategy, and monitoring and evaluation – and Section 3.2 states what each requires and the three failure modes that recur: the output arrives after the decision, the output is a table when it needed to be a finding, and targets are set in terms no account can verify. Section 3.3 covers international reporting architectures from the planning-integration side, where the case for the compilation budget is usually made.

¶3 The institutional arrangements that produce the accounts are outside this Circular. Coordination models, champions and regional platforms are treated in **TG-0.8 Implementation Readiness Assessment** Sections 3.5 and 3.9; data-sharing agreements, technical working groups and platform design in **TG-4.7 National Data Coordination Architectures**; and how governance arrangements are themselves measured and recorded in **TG-3.7 Governance Accounts**. Indicator derivation for SDG, GBF and climate reporting is **TG-2.10 Multilateral Environmental Agreement Indicators**.

¶4 Ocean accounts generate outputs that cut across the mandates of multiple agencies. SEEA EA Chapter 13 notes that an “integrated and standardized set of accounts” can support balanced decisions across social, environmental and economic dimensions¹. That integration does not happen automatically, and it does not happen at all if the output reaches the planning authority after the plan is written.

2. Requirements

¶1 Essential prerequisites:

- ¶2 **TG-0.1 General Introduction to Ocean Accounts** – for the conceptual framework and key components of Ocean Accounts, including the multiple-capitals framework for well-being and sustainability
- ¶3 **TG-1.1 OA and National Budget Processes** – for the specific procedures by which ocean account outputs feed into budget formulation, medium-term expenditure frameworks, and fiscal planning

¶4 Helpful background:

- ¶5 **TG-3.7 Governance Accounts** – for the methods used to compile governance accounts that document institutional arrangements, legal frameworks, and policy instruments

- ¶6 **TG-3.8 Combined Presentations** – for the integrated account presentations that bring together environmental, economic, and governance data for policy users
- ¶7 **TG-4.7 National Data Coordination Architectures** – for the data-sharing agreements, technical working groups, and platform design that underpin inter-agency ocean data flows

¶8 Readers approaching Section 1 for the first time should begin with **TG-1.0 Ocean Accounting and the Blue/Ocean Economy**, the framing circular for the section, which sets out the ocean economy terminology used throughout, what an ocean account can and cannot certify about a blue economy claim, and the map from a policy question to the circular that answers it. It is recommended reading, not a prerequisite.

3. Guidance Material

3.1 Embedding OA Outputs in National Development Plans

3.1.1 The rationale for planning integration

¶1 National development plans establish a country's medium- to long-term priorities for economic growth, social development, and environmental management. These plans set the strategic direction that annual budgets, sectoral strategies, and international commitments are expected to follow. For ocean-rich countries – including small island developing States, coastal nations with significant exclusive economic zones, and countries whose economies depend substantially on marine resources – the absence of ocean-related information from national development plans can result in planning frameworks that systematically undervalue marine natural capital and fail to account for the sustainability of ocean-dependent economic activities.

¶2 The 2025 SNA's new chapters on well-being and sustainability (Chapters 34–35) identify other dimensions of well-being and sustainability that “can be addressed through a suite of thematic and extended accounts”². Ocean accounts are precisely such a thematic account, providing standardised data on marine natural capital stocks, ocean ecosystem service flows, and the depletion-adjusted economic contribution of ocean sectors that development plans should consider.

¶3 The Wealth Accounting and the Valuation of Ecosystem Services (WAVES) partnership (2012–2021) demonstrated that natural capital – including fisheries, mangroves, coral reefs, and other marine assets – should be treated alongside produced and human capital when assessing a country's total wealth and development trajectory³. WAVES activities were subsequently transitioned to the Global Program on Sustainability (GPS), hosted at the World Bank. Ocean accounts extend this approach to the marine domain, providing the specific data structures needed to incorporate ocean wealth into national wealth assessments.

3.1.2 Entry points in the planning cycle

¶1 National development plans typically follow a multi-year cycle comprising situation analysis, priority setting, strategy formulation, implementation programming, and monitoring and evaluation. The governance design must ensure that account outputs are available in the right format at the right time. The most important entry points are:

¶2 **Situation analysis and diagnostics.** At the outset of a planning cycle, governments assess the current state of the economy, society, and environment. Ocean accounts provide a structured evidence base for this assessment across three account types:

- ¶3 Ocean economy thematic accounts (**TG-2.5 Structure and Function of the Ocean Economy**) quantify the sector's contribution to GDP, employment, and exports.
- ¶4 Asset accounts (**TG-3.1 Asset Accounts**) reveal whether marine natural capital is being maintained or depleted.

- ¶5 Ecosystem service flow accounts (**TG-3.2 Flows Between Environment and Economy**) document the benefits that ocean ecosystems provide to coastal communities and the broader economy.

¶6 The governance coordination body (the coordination arrangements are in **TG-0.8 Implementation Readiness Assessment** Section 3.5) should ensure that a “state of the ocean economy” synthesis is prepared and submitted to the planning authority during the diagnostic phase.

¶7 **Priority setting and resource allocation.** Depletion-adjusted ocean GVA calculations (see **TG-1.1** Section 3.4) provide the evidence needed to argue that resource management investment is a precondition for sustaining the ocean economy’s contribution to national income. If fish stock accounts record declining biomass, or ecosystem extent accounts record mangrove loss, these trends should be reflected in planning priorities alongside more conventional economic indicators.

¶8 **Monitoring and evaluation.** Because accounts are compiled on a regular cycle using consistent methods, they generate comparable time series that track progress against plan targets. The indicators derivable from ocean accounts – including ocean economy GDP share, fish stock biomass trends, ecosystem extent changes, and depletion-adjusted income measures – can serve as headline indicators for ocean-related development plan objectives. This approach aligns with SEEA EA Chapter 14’s guidance that the coherence of information across accounts is particularly important when indicators are designed to support national sustainability policies⁴.

3.1.3 Blue economy strategies

¶1 A **blue economy strategy** is a national policy framework or strategic plan that designates marine and coastal resources as priorities for sustainable economic development⁵. The guidance in this section applies equally to standalone blue economy strategies and to blue economy chapters embedded in broader national development plans. Many countries – including Seychelles and Kenya – have adopted standalone strategies, whilst others integrate blue economy objectives directly into their national development plans. A more developed conceptual architecture for the blue economy, including the linkages between blue economy measurement and national statistical frameworks, is set out in the World Bank (2022) *Blue Economy Development Framework*⁶.

¶2 A blue economy strategy grounded in ocean accounts can specify targets in terms of measurable account entries: (1) ocean economy GVA growth rates that do not exceed sustainable yield limits, (2) ecosystem extent targets for mangrove restoration or marine protected area expansion, and (3) condition thresholds for coral reef health or water quality that must be maintained as ocean industries expand. See **TG-2.5 Structure and Function of the Ocean Economy** for the account structures that underpin blue economy measurement.

¶3 The governance coordination body should ensure that the national statistical office (NSO) or designated compilation agency is formally tasked with producing the account outputs needed to monitor blue economy strategy targets. This requires a standing arrangement – not a one-off data request – that links the accounting compilation cycle to the strategy’s reporting cycle. The coordination models in **TG-0.8 Implementation Readiness Assessment** Section 3.5.1 provide options for establishing this standing arrangement.

3.1.4 Aligning compilation cycles with planning timelines

¶1 A persistent challenge in using environmental-economic accounts for planning is the lag between the reference period of the accounts and the planning decisions they are intended to inform. Many countries compile national accounts with a one- to two-year lag, and environmental accounts may face additional delays due to the complexity of ecosystem data collection. Countries should address this timing challenge through three strategies.

¶2 First, establish a regular compilation schedule aligned with the planning cycle. The coordination body should establish a release date that provides sufficient lead time for analytical synthesis ahead

of the planning review diagnostic phase, typically six months or more, subject to national planning cycles. Second, consider producing provisional or “flash” estimates for the most recent period, following the approach used by many NSOs for preliminary GDP estimates. Even approximate figures for the latest year are more useful for planning than precise figures that arrive after decisions have been made. Third, use asset account projections to extend the time horizon beyond the latest available data. The asset account structure (opening stock, additions, reductions, closing stock) supports forward projection under alternative policy scenarios, as demonstrated in the MTEF integration procedures described in **TG-1.1** Section 3.6.

3.2 Getting account outputs to the planning authority on time

¶1 The binding constraint on planning integration is rarely whether the accounts exist. It is whether the right output reaches the right forum in the window when it can affect the decision. Table 2 sets out what that requires at each entry point.

¶2 *Table 2: Account outputs by planning-cycle entry point*

Entry point	Output required	Form	Timing
Situation analysis and diagnostics	State-of-the-ocean-economy synthesis: ocean GVA and its share of GDP, employment, asset trajectories for the major stocks, ecosystem extent and condition trends	Short synthesis with a small number of headline series, not the account tables	Submitted during the diagnostic phase, typically six months or more before the plan is drafted
Priority setting and resource allocation	Depletion-adjusted ocean GVA and the gross-to-net gap; asset trajectories under current policy	The gap and its trend, with the natural capital cost stated in currency terms (TG-1.1 Section 3.4)	Before sectoral allocations are fixed
Target setting in a blue economy strategy	Measurable account entries: GVA growth bounded by sustainable yield, extent targets for restoration or protection, condition thresholds to be maintained	Targets expressed as account entries, so that progress is verifiable from the next compilation rather than from a bespoke survey	At strategy drafting
Monitoring and evaluation	The same indicators, recompiled on the same basis	Time series with methodological revisions flagged separately from real change	Each compilation cycle, aligned to the plan’s review points

¶3 Three failure modes recur, and all three are avoidable.

¶4 **The output arrives after the decision.** National accounts commonly lag one to two years, and environmental accounts often more. Where the lag exceeds the planning window, provisional or flash estimates for the most recent period are more useful than precise figures that arrive too late, provided they are labelled as provisional and subject to revision. The alternative – supplying nothing – means the plan is written against whatever numbers are to hand, which are usually worse.

¶5 **The output is a table when it needed to be a finding.** A planning authority in a diagnostic phase cannot use an account table. It can use a statement that the ocean economy contributes a stated share of GDP, that the share is growing whilst the asset base underlying it is not, and what that implies for the growth targets under consideration.

¶6 **Targets are set in terms the accounts cannot verify.** A target expressed as “improve marine ecosystem health” cannot be monitored from any account. A target expressed as an extent in hectares, a condition index against a stated reference, or catch against sustainable yield can be, and is checked automatically by the next compilation.

¶7 Asset accounts also support projection beyond the latest available data. The opening-stock, additions, reductions, closing-stock structure allows forward projection under alternative policy scenarios, which is what extends the evidence to the plan's horizon (see **TG-1.1** Section 3.6 for the MTEF case and **TG-2.1** Section 3.6.2 for condition trajectories).

3.3 International Reporting Architectures

¶1 Countries face a growing set of international reporting obligations that draw on ocean data – the SDGs, the Kunming-Montreal Global Biodiversity Framework, the Paris Agreement, regional fisheries bodies, and the BBNJ Agreement. The mapping from account entries to each indicator is set out in **TG-2.10 Multilateral Environmental Agreement Indicators**, which is normative for indicator derivation across all of these frameworks.

¶2 The planning-integration point is narrower, and is worth stating separately because it is where the investment case is usually won. SEEA EA para 14.28 notes that ocean accounts allow a country to report to multiple monitoring frameworks from a **single coherent database**. Mapping the country's obligations against the account entries that serve them has two effects: it demonstrates that one compilation programme serves several reporting commitments at once, which strengthens the budget case; and it exposes duplication, where the same fish stock data are currently compiled separately for SDG 14.4.1, for RFMO reporting and for domestic fisheries management. Consolidating those into one compilation reduces workload and removes the inconsistencies that arise when the same underlying quantity is reported three times from three processes.

¶3 Whoever coordinates the accounting programme should ensure the national SDG focal point, the CBD focal point and the UNFCCC focal point are each connected to the compilation cycle, so that indicator reporting draws on the accounts rather than running a parallel data collection.

4. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

5. References

1. ¶1 United Nations. (2021). *System of Environmental-Economic Accounting – Ecosystem Accounting*, para 13.77. Adopted as a statistical standard by the United Nations Statistical Commission at its 52nd session, March 2021.
2. ¶2 United Nations. (2025). *System of National Accounts 2025*, Annex 4, paras A4.110-A4.112: Broadening the framework of national accounts to address well-being and sustainability. Adopted by the United Nations Statistical Commission at its 56th session, March 2025.
3. ¶3 World Bank. (2021). *Wealth Accounting and the Valuation of Ecosystem Services (WAVES): Lessons Learned and Next Steps*. Washington, DC: World Bank. The WAVES programme (2012–2021) supported natural capital accounting implementation in over 20 countries, generating evidence on institutional arrangements for integrating natural capital data into development planning. WAVES activities were subsequently transitioned to the Global Program on Sustainability (GPS), hosted at the World Bank.
4. ¶4 United Nations. (2021). *System of Environmental-Economic Accounting – Ecosystem Accounting*, para 14.35.
5. ¶5 World Bank. (2017). *The Potential of the Blue Economy: Increasing Long-term Benefits of the Sustainable Use of Marine Resources for Small Island Developing States and Coastal Least Developed Countries*. Washington, DC: World Bank Group.
6. ¶6 World Bank. (2022). *Blue Economy Development Framework*. Washington, DC: World Bank Group.

Ocean Accounts and Private Sector Decision-Making

Helps corporate sustainability officers, risk officers and business analysts use Ocean Accounts for nature-related disclosure, supply chain risk and capital allocation.

Version 0.8.1 **Status** Draft **Stability** Emerging

Last updated September 2026 **Responsible officer** Dr Jordan Gacutan

Drafting AI-assisted drafting from GOAP Secretariat source materials; source list to be published at the close of consultation.

OUTCOME

After reading this Circular, corporate sustainability officers, chief risk officers and ocean-sector business analysts will be able to use nationally compiled Ocean Accounts as a structured data source for private sector decision-making: nature-related financial disclosure, supply chain risk assessment, capital allocation and corporate strategy. The Circular explains how national account outputs translate into enterprise-relevant signals about ocean dependencies, impacts, risks and opportunities.

Section 3.2 works the TNFD LEAP process through phase by phase, naming the account each phase draws on. Section 3.3 is the publication’s single source for the mapping between account outputs and the TNFD, IFRS S1 and CSRD disclosure requirements. Section 3.4 covers supply chain exposure, Section 3.6 capital allocation and ocean opportunity, and Section 3.7 scans applications still at an early stage.

Section 3.5 addresses the constraint that governs all of it: national accounts are compiled at country or large sub-national scale, whilst corporate reporting requires site-level data. The disaggregation and attribution methods are specified in [TG-3.11 Sub-National Ocean Accounts](#) Sections 3.1 to 3.4; what this Circular sets out is what a firm must ask of the national statistical office before relying on a disaggregated figure, and which services support a defensible attribution rather than a contribution estimate.

CONTENTS

1. Outcome 3

2. Requirements 3

3. Guidance Material 3

 3.1 Why Ocean Accounts Matter for the Private Sector 4

 3.2 The TNFD LEAP Framework Applied to Ocean Contexts 4

 3.3 Corporate Disclosure: TNFD, IFRS S1, and CSRD 7

 3.4 Supply Chain Ocean Risk Assessment 11

 3.5 Connecting National Ocean Accounts to Corporate Reporting 12

 3.6 Capital Allocation and Ocean Opportunity 12

 3.7 Horizon Scan: Emerging Applications 13

4. Acknowledgements 14

5. References 14

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<https://guidance.oceanaccounts.org/circulars/section-1/1-11-private-sector/>

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DRAFT

¶1 ⓘ Framework Position

¶2 This Circular addresses how private sector corporations use nationally compiled Ocean Accounts data to identify nature-related dependencies and impacts, inform disclosure under TNFD and IFRS S1, and integrate ocean risk into capital allocation and supply chain decisions. It sits at the intersection of the public finance guidance in TG-1.7 OA and Multilateral Development Finance and TG-1.8 OA and Project-Level Finance and the investment indicator compilation in TG-2.6 Ocean-related Investment, extending both toward the enterprise level.

1. Outcome

¶1 After reading this Circular, corporate sustainability officers, chief risk officers and ocean-sector business analysts will be able to use nationally compiled Ocean Accounts as a structured data source for private sector decision-making: nature-related financial disclosure, supply chain risk assessment, capital allocation and corporate strategy. The Circular explains how national account outputs translate into enterprise-relevant signals about ocean dependencies, impacts, risks and opportunities.

¶2 Section 3.2 works the TNFD LEAP process through phase by phase, naming the account each phase draws on. Section 3.3 is the publication's single source for the mapping between account outputs and the TNFD¹, IFRS S1² and CSRD³ disclosure requirements. Section 3.4 covers supply chain exposure, Section 3.6 capital allocation and ocean opportunity, and Section 3.7 scans applications still at an early stage.

¶3 Section 3.5 addresses the constraint that governs all of it: national accounts are compiled at country or large sub-national scale, whilst corporate reporting requires site-level data. The disaggregation and attribution methods are specified in **TG-3.11 Sub-National Ocean Accounts** Sections 3.1 to 3.4; what this Circular sets out is what a firm must ask of the national statistical office before relying on a disaggregated figure, and which services support a defensible attribution rather than a contribution estimate.

2. Requirements

¶1 **Essential prerequisites:**

- ¶2 **TG-0.1 General Introduction to Ocean Accounts** – for the conceptual framework, key components, and scope of Ocean Accounts

¶3 **Helpful background:**

- ¶4 **TG-1.7 OA and Multilateral Development Finance** – for the disclosure framework context (TNFD, IFRS S1) and how development finance institutions engage with ocean data. Section 3.4 of TG-1.7 is directly relevant
- ¶5 **TG-1.8 OA and Project-Level Finance** – for project-level instrument structuring (blue bonds, PES, debt swaps) and TNFD alignment at the asset level
- ¶6 **TG-2.6 Ocean-related Investment** – for ocean investment indicator compilation and the GFCF framework that underlies sustainable finance product design

¶7 Readers approaching Section 1 for the first time should begin with **TG-1.0 Ocean Accounting and the Blue/Ocean Economy**, the framing circular for the section, which sets out the ocean economy terminology used throughout, what an ocean account can and cannot certify about a blue economy claim, and the map from a policy question to the circular that answers it. It is recommended reading, not a prerequisite.

3. Guidance Material

3.1 Why Ocean Accounts Matter for the Private Sector

¶1 Private sector actors are ocean-dependent across a wider range of industries than is commonly recognised. The **ocean economy** accounts for approximately USD 1.5 trillion of value added per year globally (2010 baseline estimate), supporting over 30 million full-time equivalent jobs.⁴ It spans fisheries, aquaculture, marine transport, offshore energy, coastal tourism, marine biotechnology, and coastal construction. The economy-wide dependencies extend well beyond these direct-use sectors, as documented in **TG-2.2 Macro-economic Dependencies on Ocean Ecosystems**. Marine and coastal ecosystems supply services that underpin land-based economic activities. Coastal ecosystems provide storm and flood protection that reduces insurance losses and infrastructure costs. Ocean carbon cycling regulates climate stability that shapes agricultural productivity. Marine biodiversity underpins pharmaceutical discovery, and ocean fisheries supply protein that supports global food system resilience.

¶2 The TNFD defines **nature-related risks** as “the potential threats posed to an organisation as a result of its or others’ dependencies and impacts on nature.”⁵ These risks manifest as:

- ¶3 **Physical risks** – disruptions to business operations and supply chains arising from ecosystem degradation (e.g., coral reef decline reducing coastal protection, marine pollution undermining aquaculture production, fisheries stock collapse affecting food processors)
- ¶4 **Transition risks** – policy, regulatory, and market changes as societies respond to nature loss (e.g., carbon pricing, marine protected area expansion, sustainable fisheries certification requirements)
- ¶5 **Systemic risks** – non-linear and potentially catastrophic shifts in ecosystem function that exceed the adaptive capacity of individual firms and financial systems

¶6 Ocean Accounts provide the systematic baseline data against which these risks can be assessed. These accounts compile spatially explicit stock and flow information about ocean natural capital at the national and subnational level, the scale at which physical and transition risks originate.

¶7 ⓘ Concrete Application

¶8 A seafood processor with sourcing operations in a coastal country can cross-reference its sourcing locations with national ecosystem condition accounts to identify whether fish stocks and water quality indicators in those areas are stable, declining, or recovering. Unavailable at the project or firm level, this systemic data anchors a TNFD LEAP assessment in nationally standardised information, which ad hoc monitoring data cannot supply on its own.

3.2 The TNFD LEAP Framework Applied to Ocean Contexts

¶1 The TNFD recommends that organisations use its **LEAP** process (Locate, Evaluate, Assess, Prepare) to identify and assess nature-related issues across their business activities and value chains.⁶ Each phase of LEAP can be structured using Ocean Accounts data. Figure 1.11.1 illustrates how the different Ocean Account types feed each LEAP phase as a many-to-many relationship rather than one account per phase, distinguishing the principal account input for each phase from account types also drawn upon.

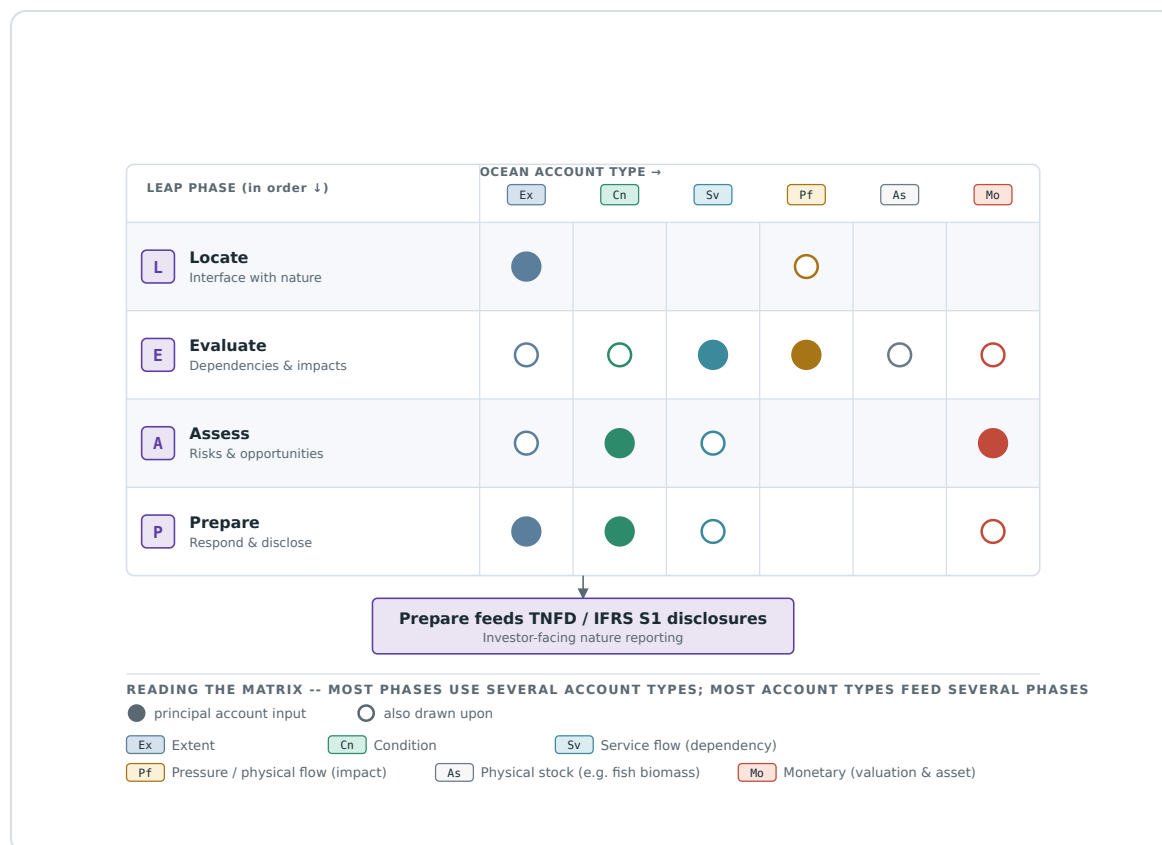


Figure 1.11.1 Ocean Account types map many-to-many onto TNFD LEAP phases, with principal and secondary inputs marked per cell. [a] Solid mark (●) = principal input. [b] Ring (○) = also drawn upon. Account chips follow Figure 1.2.1.

Source: TG-1.11 §3.2.1--3.2.4 (LEAP-Ocean Account interface); Tables 3.2.2 and 3.3.1; §3.4 (supply chain ocean risk).

Adapted from: TNFD Recommendations and LEAP approach guidance v1.0 (September 2023), Section 4 (the LEAP approach).

3.2.1 Locate – Identifying Business-Ocean Interfaces

¶1 The first LEAP phase requires identifying where in the world business activities and value chains interact with ocean and coastal ecosystems. Ocean Accounts support this phase through:

- ¶2 **Ecosystem extent accounts:** Nationally compiled spatial data on the distribution of marine habitat types (mangroves, coral reefs, seagrass meadows, open ocean, shelf ecosystems) against which business facility locations and sourcing geographies can be overlaid
- ¶3 **Priority area identification:** TNFD recommends identifying locations in or adjacent to biodiversity-sensitive areas, including marine protected areas and Key Biodiversity Areas (KBAs).⁷ Ecosystem extent accounts compiled within national Ocean Accounts frameworks typically incorporate protected area boundaries and can be queried to determine whether business activities fall within or near ecologically significant zones
- ¶4 **Catchment-to-coast linkages:** Many ocean-affecting business activities occur inland. Residual flow accounts in Ocean Accounts track nutrient and pollutant loads reaching coastal waters, enabling firms with upstream agricultural, industrial, or urban operations to assess their downstream ocean footprint

3.2.2 Evaluate – Assessing Dependencies and Impacts

¶1 The second LEAP phase evaluates the nature of the firm's dependencies on, and impacts to, ocean ecosystems at the identified interfaces. Ocean Accounts support this phase through two complementary pathways. The account types referenced here are compiled using the methods described in **TG-3.1 Asset Accounts**.

¶2 **Dependency assessment** draws on ecosystem service supply and use tables to quantify the contribution of marine natural capital to business inputs. Key dependency types for ocean-adjacent sectors include:

¶3 *Table 3.2.2: Ocean ecosystem dependencies by sector and relevant Ocean Account components.*

Sector	Ocean Ecosystem Dependency	Relevant Account Type
Capture fisheries (wild-catch)	Fish stock biomass, ocean productivity, trophic structure	Flow accounts, condition accounts, asset accounts
Aquaculture	Water quality, nutrient cycling, coastal hydrodynamics	Flow accounts, condition accounts
Coastal tourism	Beach quality, coral reef condition, biodiversity	Condition accounts, cultural service flows
Marine transport	Port access, dredging requirements, storm exposure	Extent accounts, condition accounts
Coastal construction	Shoreline stability, sediment supply, flood exposure	Condition accounts, regulating service flows
Offshore energy	Seabed stability, marine spatial availability, corrosion risk	Extent accounts, condition accounts
Pharmaceuticals / biotech	Marine biodiversity, species inventories	Condition accounts, extent accounts
Insurance / reinsurance	Coastal protection services, storm damage exposure	Regulating service flow accounts

¶4 **Impact assessment** draws on physical flow accounts (pressures) to quantify the firm's contribution to changes in ocean ecosystem state. The TNFD defines impacts as "changes in the state of nature (quality or quantity), which may result in changes to the capacity of nature to provide social and economic functions."⁸ Ocean Accounts record the aggregate pressure signals, such as total nutrient loading, total extraction volumes relative to sustainable yield, and total extent change, against which individual firm contributions can be contextualised. For firms where ecosystem impacts require formal assessment, the methodological bridge between project-level environmental impact assessment and nationally compiled account baselines is described in **TG-1.6 OA and Environmental Impact Assessment**.

3.2.3 Assess – Quantifying Nature-Related Risks and Opportunities

¶1 The third LEAP phase translates dependency and impact findings into material risks and opportunities. Ocean Accounts support risk quantification in two ways.

¶2 **Trend-based risk signals:** Time-series accounts reveal whether ocean natural capital is stable, declining, or recovering. A firm whose supply chain depends on coral reef-based tourism can read declining coral condition indicators, compiled across national extent and condition accounts, as a direct signal of increasing physical risk to its revenue base, without needing to commission bespoke environmental monitoring.

¶3 **Valuation of service dependencies:** Monetary ecosystem service accounts compile exchange-value estimates of the economic contribution of marine natural capital to production. These valuations show the scale of the economic contribution at stake from ecosystem degradation. They are not estimates of the financial loss a firm would bear, which depends on how far and how fast a service declines and on the firm's own exposure and response⁹. A coastal hotel group can, for example, use the replacement cost of coral reef coastal protection services (compiled in the monetary ecosystem service flow account), scaled to the stretch of coast it occupies, as a starting point for estimating the capital cost of the engineered protection it would need if reef degradation removed that natural protection; its insurance costs depend instead on expected storm damage at its own sites.

¶4 Alongside risk quantification, the Assess phase identifies **nature-related opportunities**. For private sector actors, ocean-related opportunities include:

- ¶5 Access to sustainable ocean finance products (blue bonds, nature performance bonds) that offer preferential terms to borrowers demonstrating credible ocean stewardship data, as described in **TG-1.8 OA and Project-Level Finance**
- ¶6 Market access and reputational premiums for sustainable seafood certifications backed by Ocean Account condition indicators
- ¶7 New revenue streams from blue carbon markets, nature-based solutions, and ecosystem service payments
- ¶8 Cost reduction through supply chain resilience built on ecosystem health rather than degrading natural capital stocks

3.2.4 Prepare – Strategy, Disclosure, and Targets

¶1 The fourth LEAP phase translates assessment findings into disclosures, strategies, risk management actions, and targets. Section 3.3 addresses disclosure frameworks, and Section 3.4 addresses capital allocation and targets.

3.3 Corporate Disclosure: TNFD, IFRS S1, and CSRD

¶1 Three parallel disclosure trajectories are converging toward a common set of requirements: voluntary (TNFD), standards-based (IFRS), and regulatory (CSRD/ESRS). This section is the single source for the mapping between ocean account outputs and disclosure requirements; **TG-1.7** and **TG-1.8** cross-refer to it rather than restating it. Ocean Accounts compiled at the national level provide the population-level data that makes corporate disclosures internationally comparable and independently verifiable.

3.3.1 TNFD Recommended Disclosures

¶1 The TNFD September 2023 recommendations specify 14 disclosures structured around four pillars: Governance, Strategy, Risk and Impact Management, and Metrics and Targets.¹⁰ For ocean-dependent or ocean-affecting businesses, the most material disclosures map directly onto Ocean Account components. The table below lists the disclosures of greatest relevance to ocean contexts. Firms should consult the full TNFD recommendations for the complete set of 14 required disclosures.

¶2 *Table 3.3.1: TNFD recommended disclosures most relevant to ocean-dependent businesses (selected from the full set of 14 recommended disclosures).*

Pillar	TNFD Disclosure	Description	Ocean Account Source
Strategy	Strategy A	Nature-related dependencies, impacts, risks, and opportunities	Ecosystem service supply and use tables; condition accounts
Strategy	Strategy B	Effect on business model and value chain	Flow accounts linking ocean inputs to sectoral outputs
Strategy	Strategy C	Resilience of strategy to nature-related scenarios	Time-series trend data from extent and condition accounts
Strategy	Strategy D	Locations of assets in priority areas	Ecosystem extent accounts with MPA and KBA overlays

Pillar	TNFD Disclosure	Description	Ocean Account Source
Risk & Impact Mgmt	Risk A(i), A(ii)	Processes for identifying, assessing and prioritising nature-related issues in direct operations (A(i)) and in the value chain (A(ii))	LEAP process supported by nationally compiled account baselines
Metrics & Targets	Metrics A	Metrics used to assess and manage nature-related risks and opportunities	Change in ecosystem condition and extent over time
Metrics & Targets	Metrics B	Metrics used to assess and manage dependencies and impacts on nature	Condition indicators, extent indicators, service flow volumes
Metrics & Targets	Metrics C	Targets and performance against targets	Account-derived baselines enabling target-setting and monitoring

¶3 The three Governance disclosures (Gov A: Board oversight of nature-related issues; Gov B: Management's role in assessing and managing nature-related issues; Gov C: human rights policies and engagement with Indigenous Peoples, Local Communities and affected stakeholders) are structural governance requirements that apply uniformly across all sectors and are not specific to Ocean Account data inputs. Similarly, Risk B (processes for managing nature-related issues) and Risk C (integration into overall risk management) describe internal management systems rather than ecosystem data requirements, and are omitted from the table. The nine disclosures shown above are those where Ocean Account data provides the most direct input.

¶4 The TNFD also defines **additional global disclosure metrics** relevant to ocean contexts, including metrics for water quality, marine ecosystem extent, and the value of sustainable finance instruments.¹¹ Ocean Account condition and extent tables provide a direct data source for these metrics, converting nationally standardised environmental monitoring data into enterprise-level disclosure inputs.

¶5 **Sector-specific TNFD pathways:** The TNFD has published sector-specific additional guidance for a range of sectors including aquaculture, fisheries, marine transport, and coastal infrastructure, among others. These sector pathways cross-reference SEEA EA concepts directly, making Ocean Accounts a natural data input to sector-aligned TNFD reporting.

3.3.2 IFRS S1 and Nature-Related Financial Information

¶1 IFRS S1 (General Requirements for Disclosure of Sustainability-related Financial Information), issued June 2023 and effective for annual reporting periods beginning on or after 1 January 2024, establishes that sustainability-related information should be material to the primary users of general-purpose financial reports – investors, lenders, and other creditors.¹² Application is voluntary or jurisdiction-dependent, as national adoption by securities regulators is required for mandatory application. Nature-related dependencies and impacts qualify as material when they affect an entity's cash flows, access to finance, or cost of capital. (IFRS S2 on climate-related financial information is a separate standard. For ocean-climate accounting connections, see **TG-2.8 Climate Change Indicators**.)

¶2 For ocean-dependent businesses, material nature-related information under IFRS S1 typically includes:

- ¶3 **Value chain dependencies:** Quantified reliance on marine provisioning services (fish stock productivity, water quality for aquaculture) that generate revenue or underpin cost structures
- ¶4 **Physical risk exposure:** Estimated financial exposure to ecosystem degradation translating into supply disruption, infrastructure damage, or increased operating costs
- ¶5 **Transition risk exposure:** Revenue at risk from marine resource use regulation, sustainable certification requirements, or carbon pricing affecting ocean industries

- ¶6 **Opportunities:** Quantified upside from sustainable ocean finance, ecosystem service revenues, and nature-positive supply chain premiums

¶7 Ocean Accounts provide the population-level time series against which entity-level IFRS S1 disclosures can be contextualised and verified.¹³

3.3.3 CSRD Double Materiality and Ocean Dependencies

¶1 The European Union's CSRD (in force from January 2024 for large listed companies, with phased application extending to 2026 for smaller in-scope entities) requires companies to conduct a **double materiality assessment**: evaluating both how sustainability matters affect the company (financial materiality) and how the company affects sustainability matters (impact materiality).¹⁴ The European Sustainability Reporting Standards (ESRS) elaborate specific requirements for biodiversity and ecosystem-related disclosures under ESRS E4 (Biodiversity and Ecosystems).

¶2 ESRS E4 requires disclosure of:

- ¶3 Material locations where business activities interface with biodiversity-sensitive areas
- ¶4 Drivers of biodiversity change attributable to business activities (land and sea use change, pollution, resource use, invasive species, climate change)
- ¶5 Targets and metrics related to ecosystem extent and condition

¶6 Ocean Accounts compiled for coastal and marine areas provide a direct data source for ESRS E4 compliance by European companies with ocean-facing operations or supply chains. Condition indicators from national ecosystem accounts can populate the ecosystem condition metrics required under ESRS E4, whilst extent accounts document changes in marine habitat area attributable to sectors in which a company operates.

¶7 Across TNFD, IFRS S1, and CSRD, the common requirement is for ecosystem baseline data that is spatially explicit, compiled against recognised methodologies, and comparable across time. Firm-level environmental monitoring data cannot meet all three requirements at once. Nationally compiled Ocean Accounts can.

3.3.4 Standardised impact indicator templates

¶1 This section provides templates for deriving impact indicators from Ocean Accounts that satisfy the requirements of three major frameworks: the Taskforce on Nature-related Financial Disclosures (TNFD), the IFRS Sustainability Disclosure Standards (S1 and S2), and the Convention on Biological Diversity (CBD) Global Biodiversity Framework Target 15.

¶2 **TNFD-aligned indicators.** The TNFD recommends disclosure of dependencies and impacts on nature across four realms (land, ocean, freshwater, atmosphere). For ocean contexts, Ocean Accounts provide direct measurement of the core TNFD metrics:

TNFD Metric Category	Ocean Account Source	Indicator	Unit
Extent of ecosystems	Ecosystem extent accounts	Change in ecosystem area by type	Hectares
Condition of ecosystems	Ecosystem condition accounts	Condition index relative to reference	Index (0-1)
Dependencies on ecosystem services	Physical supply and use tables	Value of ecosystem service inputs to economic activity	Currency units per year
Impacts on ecosystems	Physical flow accounts	Pollutant loads, extraction rates	Tonnes per year
Value at stake	Asset accounts (monetary)	NPV of ecosystem assets exposed to degradation	Currency units

¶3 **IFRS S1/S2-aligned indicators.** IFRS S1 requires disclosure of sustainability-related risks and opportunities that could reasonably be expected to affect an entity's cash flows, access to finance, or cost of capital. IFRS S2 addresses climate-related disclosures specifically. Ocean Accounts support these disclosures by providing:

IFRS Requirement	Ocean Account Source	Application
Governance over sustainability risks	Institutional arrangements for account compilation	Demonstrates structured oversight of environmental data
Strategy: dependencies and impacts	Supply and use tables, condition accounts	Quantifies nature dependencies and transition risks
Risk management processes	Time-series account compilation	Provides systematic monitoring of nature-related risk indicators
Metrics: GHG emissions (S2)	Carbon stock and flow accounts (context only)	Does not supply the metric: IFRS S2 para 29(a) requires the entity's own Scope 1, 2 and 3 emissions, measured under the GHG Protocol Corporate Standard. National blue carbon accounts give context for an entity's land-use emissions and removals, reported separately
Metrics: transition plan targets	Extent and condition target accounts	Provides measurable benchmarks for nature-positive targets

¶4 **CBD Target 15 indicators.** CBD Target 15 requires that large and transnational businesses and financial institutions regularly monitor, assess, and transparently disclose their risks, dependencies, and impacts on biodiversity. Ocean Accounts provide the measurement infrastructure for Target 15 compliance by enabling businesses to:

- ¶5 Identify and quantify dependencies on marine biodiversity using ecosystem service supply and use tables
- ¶6 Monitor impacts on marine ecosystems through changes in extent and condition accounts
- ¶7 Report on risks using monetary asset accounts that show the exchange value of ecosystem assets at stake from biodiversity loss (not the financial loss an entity would bear)
- ¶8 Disclose progress against nature-positive commitments using standardised account-derived metrics

¶9 **Template for integrated impact reporting.** Practitioners preparing impact reports for ocean-related investments can use the following template structure, with each metric sourced directly from Ocean Account tables:

Impact Domain	Metric	Baseline Value	Current Value	Target	Account Table Reference
Ecosystem extent	Area of target ecosystem (ha)	[from extent accounts]	[from extent accounts]	[project target]	SEEA EA Table 4.1
Ecosystem condition	Condition index (0-1 scale)	[from condition accounts]	[from condition accounts]	[project target]	SEEA EA Table 5.1
Carbon sequestration	Annual sequestration (tCO ₂ e/yr)	[from carbon accounts]	[from carbon accounts]	[project target]	SEEA CF Table 3.4
Economic contribution	Value added from ocean sector (currency)	[from economic accounts]	[from economic accounts]	[project target]	SNA Table 14.1

Impact Domain	Metric	Baseline Value	Current Value	Target	Account Table Reference
Social outcomes	Employment in ocean sectors (persons)	[from employment accounts]	[from employment accounts]	[project target]	SNA Table 19.1

¶10 For the underlying extent and condition accounts, see **TG-3.1 Asset Accounts** and **TG-2.1**. Development finance applications of the same templates are in **TG-1.7**; project-level instruments in **TG-1.8**.

3.4 Supply Chain Ocean Risk Assessment

¶1 For many firms, the most material ocean-related risks arise not in direct operations but in supply chains. Global supply chains for seafood, agricultural commodities, raw materials, and manufactured goods intersect with ocean ecosystems through production locations, shipping routes, port infrastructure, and water use. Ocean Accounts enable firms to map and quantify supply chain exposure to ocean ecosystem risk.

¶2 **Mapping supply chain exposure:** The first step in supply chain ocean risk assessment is identifying which supply chain nodes interact with ocean or coastal ecosystems. For seafood and aquaculture supply chains, direct identification is straightforward. For other commodity supply chains, the interactions are often indirect (coastal port exposure, river-to-ocean nutrient loading from agricultural inputs, offshore industrial effluent). Ocean Accounts, particularly residual flow accounts and extent accounts, provide the spatial context needed to assess where supply chain node geographies coincide with ecologically significant or deteriorating marine areas.

¶3 **Quantifying exposure:** Once supply chain nodes are mapped to ocean ecosystem contexts, condition and trend data from Ocean Accounts enable quantification of:

- ¶4 The share of sourcing volumes exposed to declining ecosystem conditions
- ¶5 The proportion of supply chain nodes located in areas where national accounts record increasing pressure relative to carrying capacity
- ¶6 The time horizon over which current extraction or land-use trajectories are consistent with sustainable ecosystem function, based on trends in stock accounts

¶7 **Industry-specific applications:** The following sectors illustrate how supply chain ocean risk assessment draws on specific Ocean Account components:

¶8 *Seafood and aquaculture:* Fish stock accounts and ecosystem condition indicators compiled within national Ocean Accounts frameworks provide the most direct data source for assessing fishery health. Condition indicators including spawning stock biomass, mean trophic level, and the proportion of stocks fished within sustainable limits are derivable from well-compiled national accounts. Firms can use these indicators to segment their sourcing portfolio by sustainability risk, informing supplier engagement and procurement policy.

¶9 *Agricultural commodities:* Crops grown in coastal watersheds contribute to coastal eutrophication through fertiliser runoff. National residual flow accounts track nutrient loads reaching coastal waters at the catchment level. Firms sourcing from coastal agricultural regions can use these accounts to identify high-risk sourcing areas and engage suppliers on nutrient management practices.

¶10 *Marine transport and logistics:* Port infrastructure faces increasing physical risk from sea level rise, intensified storm events, and coral reef degradation (which affects wave attenuation). Coastal infrastructure accounts and regulating service flow accounts compiled within national Ocean Accounts frameworks document trends in coastal protection service capacity. These trends give logistics operators a basis for assessing port-level physical risk exposure.

¶11 *Financial services (insurance and lending)*: Insurers and lenders with portfolios exposed to coastal real estate, fisheries, aquaculture, or marine infrastructure face physical and transition risk from ocean ecosystem change. Ocean Accounts compiled at the national level provide the standardised, time-series ecosystem trend data that enables portfolio-level screening for nature-related risk concentration. Banks and asset managers also face **lender liability** risk where financing is extended to borrowers whose operations contribute to marine ecosystem degradation. Ocean Account pressure data can inform pre-lending due diligence and ongoing portfolio monitoring for such exposures.

3.5 Connecting National Ocean Accounts to Corporate Reporting

¶1 ⚠ Common Misconception

¶2 National Ocean Accounts are compiled at the country or large subnational scale and are not designed to report data at the level of an individual firm or site, whilst this does not render them irrelevant to corporate reporting: the spatial disaggregation and attribution methods described in this section allow nationally compiled data to be translated into enterprise-relevant inputs.

¶3 A central challenge for private sector users of Ocean Accounts is the **scale mismatch**: national accounts are compiled at country or large subnational levels, whilst corporate reporting typically requires asset-level or site-level data.

3.5.1 Spatial disaggregation and attribution

¶1 The method for disaggregating national totals to a site or sourcing geography, and for attributing a share of area totals to a single firm, is set out in **TG-3.11 Sub-National Ocean Accounts** Sections 3.1 to 3.4. Firms should not construct their own downscaling: an overlay performed without the reconciliation TG-3.11 Section 3.2 requires produces site-level figures that do not sum back to the national totals they were derived from, which is precisely what makes a disclosure unverifiable.

¶2 Three questions to put to the national statistical office or ocean management agency before relying on disaggregated figures:

- ¶3 **At what resolution are the relevant accounts compiled**, and is that fine enough to resolve the firm's sites or sourcing areas?
- ¶4 **Has the disaggregation been reconciled to national totals**, and by what method?
- ¶5 **What denominator should a firm-level share be expressed against**, and for which services is a reported-volume attribution available rather than a contribution estimate?

¶6 For provisioning services with harvest or extraction reporting, a firm's share of national extraction is a defensible attribution. For regulating and cultural services it is not: those rest on contribution analysis and should be disclosed as approximations, with the basis stated. Where TNFD sector guidance or Science Based Targets Network methods specify an ocean attribution approach, those take precedence.

3.5.2 Temporal alignment

¶1 National Ocean Accounts are compiled on an annual or multi-year basis. Corporate reporting cycles (annual reports, sustainability reports) require current-year data. In countries with regular account compilation cycles, firms can typically access recent-period account data. In countries where accounts are less frequently updated, firms may need to extrapolate from the most recent compilation using supplementary indicator data or to flag the data vintage in their disclosures. Firms should document the data vintage and spatial resolution of Ocean Account data used in disclosures, consistent with IFRS S1 requirements for transparency about data quality and limitations.¹⁵

3.6 Capital Allocation and Ocean Opportunity

¶1 **Sustainable ocean finance access:** As described in **TG-1.8 OA and Project-Level Finance**, blue bonds, sustainability-linked bonds, and debt-for-nature instruments offer preferential financing terms to borrowers whose activities demonstrate credible, measurable ocean stewardship. Firms that have already conducted Ocean Account-grounded dependency and impact assessments are well-positioned to access these instruments, because the baseline and monitoring data required by instrument covenants is already compiled. The investment indicator framework in **TG-2.6 Ocean-related Investment** describes how ocean-related investment is tracked at the national level, providing context for benchmarking firm-level capital allocation against national and sectoral trends.

¶2 **Ecosystem service revenue:** In jurisdictions with active payment for ecosystem services (PES) schemes or carbon markets, firms that protect or restore coastal and marine ecosystems can generate revenue from ecosystem service payments. Ocean Accounts underpin the baseline and additionality assessments required by PES and carbon market protocols. Firms operating in the aquaculture, coastal tourism, or offshore energy sectors frequently have the spatial presence and management authority over coastal and marine ecosystems that is required to participate in PES and blue carbon markets, as further described in **TG-6.2 Mangrove and Coastal Wetland Accounting**.

¶3 **Biodiversity offsetting:** In jurisdictions where regulatory or voluntary frameworks require businesses to offset residual biodiversity impacts, Ocean Account condition and extent data provide the measurement baseline needed to quantify impact and verify the ecological integrity of offset sites. Specifically, national ecosystem condition indicators serve as the reference state against which the additionality of proposed offset activities is assessed. This application is growing as national regulators adopt no-net-loss or net-gain policies for marine development. These policies create demand for standardised, independently verifiable baseline data that national Ocean Accounts are well placed to supply.

¶4 **Nature-positive supply chain premiums:** Consumer markets increasingly reward sustainable sourcing through certification premiums (Marine Stewardship Council, Aquaculture Stewardship Council) and retailer procurement preferences. Ocean Account condition indicators aligned with certification sustainability criteria, particularly fish stock status and ecosystem condition, can provide the third-party verifiable baseline data that certification bodies increasingly require.

¶5 **Strategic positioning in the nature economy:** The Kunming-Montreal Global Biodiversity Framework (GBF) Target 15 calls on businesses and financial institutions to regularly monitor, assess, and transparently disclose nature-related dependencies, impacts, risks, and opportunities by 2030.¹⁶ The GBF also sets Target 19 to mobilise at least USD 200 billion per year for biodiversity finance by 2030, from all sources (public and private), with private sector mechanisms expected to contribute a growing proportion of this total.

3.7 Horizon Scan: Emerging Applications

¶1 Several application areas are at early-stage development but are likely to become material within the planning horizon of major corporations and financial institutions. Methods and markets are still developing. The degree to which Ocean Accounts will fulfil these roles depends on continued investment in national account compilation and private sector capacity.

¶2 **Portfolio-level nature risk screening:** Asset managers and institutional investors are beginning to develop ocean-specific portfolio screening tools that draw on national ecosystem trend data to identify listed equities and debt securities with material exposure to ocean ecosystem deterioration. Country-level and regional ecosystem condition information drawn from Ocean Accounts could populate these screening tools, supplementing the company-level disclosure data that currently dominates ESG screening, though the integration of national account data into commercial screening platforms remains at an early stage.

¶3 **Nature-related stress testing:** Financial supervisors in several jurisdictions are exploring nature-related scenario analysis and stress testing requirements, analogous to climate-related stress tests. Ocean ecosystems feature prominently in these scenarios, particularly coral reef collapse, fisheries stock depletion, and sea level rise affecting coastal collateral. Ocean Accounts time-series data may inform the physical scenario inputs for ocean-realm stress tests, potentially providing statistically grounded trajectories of ecosystem change, where sufficiently compiled and temporally consistent national series exist.

¶4 **Supply chain due diligence regulation:** The EU Deforestation Regulation and emerging due diligence frameworks in other jurisdictions are creating legal obligations for firms to demonstrate that supply chains do not contribute to ecosystem destruction, including marine ecosystem degradation. Due diligence verification systems could draw on national-level baseline and monitoring data from Ocean Accounts to assess whether sourcing geographies are consistent with sustainable ecosystem management, though the specific regulatory uptake of national account data for this purpose is not yet established in most jurisdictions. For the EIA-linked aspects of due diligence, see also **TG-1.6 OA and Environmental Impact Assessment**.

¶5 **Nature credits and biodiversity offsets:** Voluntary biodiversity credit markets are emerging alongside established carbon markets. These markets create a potential new asset class linked to marine biodiversity outcomes. Biodiversity credit protocols may rely on Ocean Accounts condition and extent data as the measurement infrastructure needed to verify additionality, permanence, and ecological integrity of ocean-based credits. Standardisation of measurement methodologies, currently a major barrier to voluntary biodiversity credit market development, is expected to converge on SEEA EA-aligned approaches over the medium term, though this convergence is not yet assured.

¶6 **Corporate natural capital accounting:** A small but growing number of corporations are beginning to integrate natural capital accounting into internal decision-making, valuing their dependencies on ecosystem services as part of capital budgeting and project appraisal. Ocean Accounts may provide the unit value reference data (ecosystem service values per hectare by ecosystem type) that corporate natural capital accounts require. Firms could then populate internal accounts without commissioning bespoke ecosystem service valuations for each decision, subject to the availability and spatial coverage of national monetary accounts.

4. Acknowledgements

¶1 **Authors:** [Names and affiliations]

¶2 **Reviewers:** [Names and affiliations]

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DRAFT

OA and Blue Tagging of Public Expenditure and Finance

Specifies how a financial record is classified as ocean-related at the point it is created, how a tagged aggregate reconciles with the accounts and with government finance statistics, and how tagged expenditure joins to measured ecosystem outcomes.

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Drafting AI-assisted drafting from GOAP Secretariat source materials; source list to be published at the close of consultation.

OUTCOME

This Circular specifies how a financial record is classified as ocean-related at the point that record is created – and what has to be true of that classification for the resulting aggregate to be reconcilable with the accounts. Upon completing it, readers will be able to design a blue tagging system for public expenditure that reconciles with government finance statistics, apply the same classification logic to sustainable finance instruments, reconcile the two resulting aggregates without double counting, publish a tagged figure with the metadata that makes it auditable, and join tagged expenditure to the ecosystem accounts covering the places that expenditure affected. The Circular takes its ocean boundary from [TG-3.3 Economic Activity Relevant to the Ocean](#) and its functional classification from [TG-1.1 OA and National Budget Processes](#), which sets out the COFOG classes carrying ocean-related government functions. It supplies the classification decision that populates the sustainable ocean finance aggregate measured in [TG-2.6 Ocean-related Investment](#), and the eligibility and evidence rule on which the blue bond impact reporting in [TG-1.7 OA and Multilateral Development Finance](#) and the project appraisal in [TG-1.8 OA and Project-Level Finance](#) rest.

CONTENTS

1. Outcome	3
2. Requirements	3
3. Guidance Material	3
3.1 What a tag is, and where it sits among existing methods	3
3.2 The blue boundary	7
3.3 Tagging public expenditure	8
3.4 Tagging finance flows	13
3.5 Reconciling the two aggregates	15
3.6 Blue tags alongside climate and biodiversity tags	16
3.7 Joining tagged expenditure to the accounts	16
3.8 Metadata and quality assurance	17
3.9 Implementation pathway	18
4. Limitations and Considerations	19
5. Acknowledgements	20
6. References	20

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DRAFT

1. Outcome

¶1 This Circular specifies how a financial record is classified as ocean-related at the point that record is created – and what has to be true of that classification for the resulting aggregate to be reconcilable with the accounts. Upon completing it, readers will be able to design a blue tagging system for public expenditure that reconciles with government finance statistics, apply the same classification logic to sustainable finance instruments, reconcile the two resulting aggregates without double counting, publish a tagged figure with the metadata that makes it auditable, and join tagged expenditure to the ecosystem accounts covering the places that expenditure affected.

¶2 The Circular takes its ocean boundary from **TG-3.3 Economic Activity Relevant to the Ocean** and its functional classification from **TG-1.1 OA and National Budget Processes**, which sets out the COFOG classes carrying ocean-related government functions. It supplies the classification decision that populates the sustainable ocean finance aggregate measured in **TG-2.6 Ocean-related Investment**, and the eligibility and evidence rule on which the blue bond impact reporting in **TG-1.7 OA and Multilateral Development Finance** and the project appraisal in **TG-1.8 OA and Project-Level Finance** rest.

2. Requirements

¶1 This Circular requires familiarity with:

- ¶2 **TG-0.1 General Introduction to Ocean Accounts**, for the conceptual framework and the account types referred to throughout
- ¶3 **TG-1.1 OA and National Budget Processes**, for the budget cycle and how the resulting expenditure figure is presented, and **TG-3.7 Governance Accounts** Section 3.3.5, for the COFOG concordance and the ocean-share method, all of which this Circular builds on directly
- ¶4 **TG-3.3 Economic Activity Relevant to the Ocean**, for the ocean economy scope that any tag inherits

¶5 Readers will also find the following useful, though they are not prerequisites: **TG-2.6 Ocean-related Investment** for the measurement of the aggregates a finance tag populates, **TG-3.4 Flows from Economy to Environment** for environmental protection expenditure, **TG-3.7 Governance Accounts** for the access-rights record that determines whether a coastal activity can be assessed at all, and **TG-1.11 Ocean Accounts and Private Sector Decision-Making** for the corporate disclosure frameworks that consume the same evidence.

¶6 Readers approaching Section 1 for the first time should begin with **TG-1.0 Ocean Accounting and the Blue/Ocean Economy**, the framing circular for the section, which sets out the ocean economy terminology used throughout, what an ocean account can and cannot certify about a blue economy claim, and the map from a policy question to the circular that answers it. It is recommended reading, not a prerequisite.

3. Guidance Material

3.1 What a tag is, and where it sits among existing methods

¶1 A **tag** is a classification attached to an individual financial record, applied at or near the point the record is created, and carried by that record through execution and reporting. A blue tag asserts that the record relates to the ocean, states in what respect, and retains the evidence and the identity of whoever made the assertion.

¶2 Two other methods already address the same question and neither is a tagging system. Governments and their partners have three options, set out in Table 1.

¶3 **Table 1: Three methods for producing an ocean public expenditure figure**

Property	Blue Public Expenditure Review	Apportionment	Tagging
What it is	A periodic diagnostic study of allocation, adequacy, efficiency, accountability and equity in ocean-related spending ¹	Estimation of an ocean share of published classification classes, per TG-3.7 Section 3.3.5	Classification of individual budget lines inside the government's own financial system
Boundary	A thematic scope negotiated with the client, narrow or wide, with reasons documented ¹	The ocean economy scope, applied to COFOG classes	The ocean economy scope, applied to budget lines
Timing	Episodic, typically a one-off or infrequent exercise	Ex post, after accounts close	Ex ante at formulation, or at execution
Serves	Reform advocacy, sector strategy, partner dialogue	Statistical reporting, trend analysis, international comparison	Budget formulation, in-year monitoring, appropriation debate
Standing capability	No. Rebuilt each time	Yes, at the granularity of the published classification	Yes, at the granularity of the chart of accounts
Failure mode	Findings age; no mechanism carries them into the next budget	Ratio staleness; within-class variation concealed	Inconsistent application; inflation where tagging attracts credit

¶4 The three are complementary and the relationship is worth stating plainly, because a ministry will usually meet the first of them before it meets this Circular. The World Bank's Blue Public Expenditure Review guidance note is the incumbent instrument for this question and it is well designed for what it does, which is to open a policy conversation.¹ It sets no classification underneath its scope decision, and across its thirty pages it does not discuss tagging, COFOG, or the climate expenditure review methodologies from which tagging descends – natural capital accounts appear once, in a footnote.² A Blue PER conducted on a budget that is already tagged is cheaper, repeatable, and can report a trend instead of a snapshot. Tagging is the standing infrastructure that a periodic review consumes.

¶5 Apportionment provides the external benchmark. Where the tagged envelope and the apportioned estimate diverge substantially and persistently, one of them is wrong, and the divergence is itself a quality signal (Section 3.8.2). A tagging system never compared against an apportioned estimate has no independent check on its own coverage.

¶6 Apportionment is also the cheapest thing to do first, and it is usually treated only as the check that comes last. Compiled before any tag is applied, the COFOG-based ocean share under **TG-3.7 Section 3.3.5** states which functional classes carry material ocean-related expenditure and approximately how much, which is a map of where a tagging exercise should start and a defensible reason for leaving the remainder untagged in a first year. A ministry that apports first knows the approximate size of the answer before it designs the system that will produce it, and can size the coding effort against the value at stake rather than against the number of budget lines. The same table then serves as the coherence check at Section 3.8.2 without further compilation.

3.1.1 Ocean tagging is emerging, not absent

¶1 Tagging systems for adjacent policy objectives are well established, and they are geographically spread: climate expenditure tagging in more than twenty countries across Asia, Africa and Latin

America; biodiversity expenditure classification through BIOFIN's Global Biodiversity Expenditure Taxonomy, applied in Malawi among others; SDG budget tagging, worked through in Colombia; and green budget tagging across OECD member states.³ Ocean-specific tagging is newer and thinner. UNDP lists green and blue public budget tagging among ocean finance instruments and names Blue Economy Budget Tagging in Indonesia as its example.⁴ The method of that system is not publicly documented at the time of writing, so this Circular records its existence without describing it.

¶12 What no other domain has is a compiled national account of the thing being tagged, which is what Section 3.1.3 turns on. The practical consequence for a compiler is that a blue tag will almost never be the first tag applied to a budget line. It will land alongside a climate tag, and increasingly a biodiversity tag, and Section 3.6 addresses what follows from that.

3.1.2 The same object, measured twice

¶1 The reason a tag belongs in a guidance publication on ocean accounting is that a tagged budget line and an account entry can be the same object observed at two points in its life. An appropriation is made and tagged. It is executed, and the execution is recorded in the government's financial system. In due course the expenditure appears in government finance statistics, in the environmental protection expenditure account where its purpose qualifies, and, where the accounts are compiled with sufficient granularity, against the ecosystem it was spent on.

¶2 Whether these are recognisably the same object depends on four choices made when the tag is designed. Each is cheap at design time and effectively irrecoverable afterwards:

1. ¶3 The tag's boundary is inherited from the ocean economy scope, so the tagged population and the accounted population are drawn from the same universe (Section 3.2).
2. ¶4 The tag's purpose dimension uses CEPA and CReMA classes, so tagged environmental expenditure maps to the environmental protection expenditure account without translation (Section 3.3.2).
3. ¶5 The location code the budget system already carries is mapped, through a maintained cross-walk, to the spatial units the ecosystem accounts report on (Section 3.3.2 and Section 3.7).
4. ¶6 The unweighted figure is retained wherever a proportion has been applied, so the tagged envelope stays reconcilable with fiscal aggregates (Section 3.3.3).

¶7 A tagging system missing any of the four still produces a number, and that number will not join to anything.

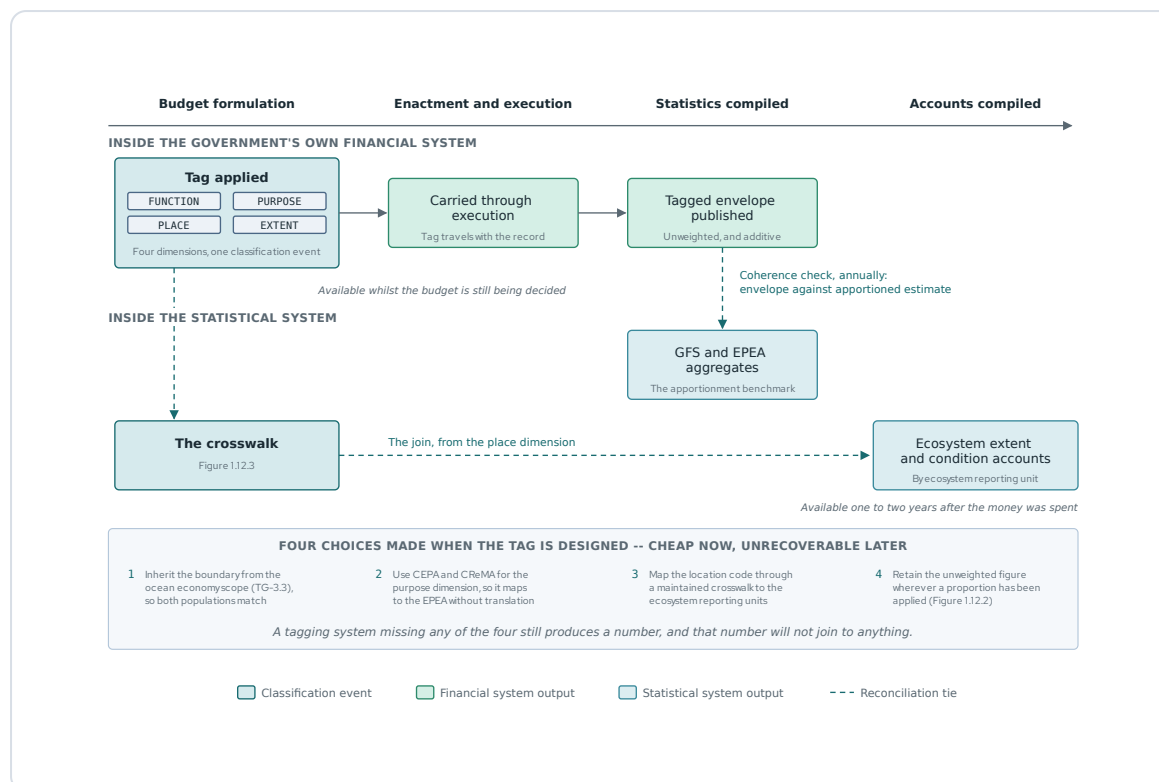


Figure 1.12.1 One appropriation observed twice: ex ante as a tag inside the financial system, and ex post as an entry in the statistical system. Two dashed ties connect them, and four design choices determine whether they can be recognised as the same object.

Source: SEEA Central Framework (2012), Chapter 4 (environmental protection expenditure account, CEPA and CReMA classifications); IMF, *Government Finance Statistics Manual 2014* (expenditure aggregates); TG-3.7, Section 3.3.5, Table 3.7.7 (COFOG mapping and the ocean-share apportionment method that supplies the benchmark).

Note: The lower lane is deliberately empty at the first two stages. The statistical system holds nothing about an appropriation until well after it is spent, which is why apportionment cannot inform budget formulation and tagging can. The timing gap is the reason for the tag, not a defect of the accounts.

3.1.3 What each system gives the other

¶1 The case for building a tagging system against the accounts, and not beside them, is that each supplies something the other cannot produce for itself. Table 2 sets out the exchange.

¶2 **Table 2: The exchange between a tagging system and the ocean accounts**

What the accounts give tagging	What tagging gives the accounts
The boundary. The ocean economy scope in TG-3.3 settles what counts as ocean-related, so the tag does not have to invent a definition it cannot defend	A demand signal. An account compiled once is a pilot; an account a finance ministry consults every budget round is infrastructure, and tagging creates the annual reason to consult it
The purpose classification. CEPA and CReMA give the tag a purpose dimension that already maps to the environmental protection expenditure account	An expenditure series by purpose and place, annual and spatially coded, which the EPEA and the ecosystem accounts have no other way of obtaining at budget-line resolution
The external check. The apportioned estimate built from COFOG and the accounts is the only test of a tagged figure that does not depend on the tagging system's own procedures (Section 3.8.2)	An ex ante figure. The accounts describe what was spent; the tag describes what is about to be spent, which is the only form in which the evidence can reach a budget decision
The outcome side. Extent and condition accounts are what turn an expenditure figure into something that can be evaluated at all (Section 3.7)	A spatial discipline. Building the crosswalk at Section 3.3.2 forces the accounts to declare reporting units a financial system can address

What the accounts give tagging	What tagging gives the accounts
The asset evidence a taxonomy screening criterion demands, in the repeated form a tiered criterion requires (Section 3.4.1)	A financing view to set against the expenditure view, and the elimination line that keeps the two from being summed (Section 3.5)

¶3 Three problems are solved by the pairing that neither solves alone. An ocean expenditure figure becomes available during budget formulation instead of two years after the fact. A published figure becomes auditable, because it reconciles to an aggregate compiled independently of the agency that produced it. And expenditure becomes joinable to measured ecosystem change, which is the precondition for ever asking whether ocean spending works.

¶4 This is also what distinguishes blue tagging from the climate, biodiversity and SDG systems it will sit alongside. Those have no compiled national account of the domain they tag against. Ocean accounting does, which means a blue tag can be checked against something, and theirs cannot.

3.2 The blue boundary

¶1 A tag needs a boundary before it needs anything else, and the boundary belongs to **TG-3.3** – a tagging system that defines its own has guaranteed that its output cannot be reconciled with the accounts. This is the principal difference from a Blue PER, whose scope is negotiated case by case and documented rather than classified.¹

¶2 What this Circular adds is the operational form of that boundary. An officer looking at a budget line applies three tests, and they do not always agree.

¶3 **The activity test.** Is the activity itself ocean-related, in the sense of TG-3.3? Four examples pass on activity alone – a fisheries licensing programme, a port dredging contract, a coastal ranger service, a marine research vessel.

¶4 **The purpose test.** Is the stated purpose of the expenditure the protection, restoration or sustainable management of a marine or coastal resource, in the sense of the CEPA and CReMA classes of the SEEA Central Framework?⁵ An upland reforestation programme whose stated objective is to reduce sediment load reaching a reef passes on purpose whilst failing on activity.

¶5 **The place test.** Does the expenditure occur in, or act on, the coastal zone or marine waters as delineated under **TG-3.11 Sub-National Ocean Accounts**? A wastewater treatment plant in a coastal city passes on place, and its ocean relevance is then a matter of degree.

3.2.1 When the tests disagree

¶1 Disagreement is the normal case, and a tagging system that states no ordering rule will produce inconsistent tags across agencies. This Circular recommends the following order, which places evidentiary defensibility above breadth.

¶2 A record satisfying the **activity** test is tagged in full. This is the expenditure that would appear in an ocean economy account on its own merits, and an auditor can confirm it without exercising judgement.

¶3 A record satisfying **purpose but not activity** is tagged, with the extent determined under Section 3.3.3 and the causal chain to a marine outcome documented. The upland reforestation example belongs here – tagging it is correct, tagging it in full is not, and tagging it without recording the sediment pathway makes the tag unreviewable.

¶4 The pathway is an account entry before it is a narrative. Residual flows from the economy to the environment are compiled under **TG-3.4 Flows from Economy to Environment**, and a sediment or nutrient flow recorded there from a catchment to a receiving marine unit is what the documented chain should cite. Where that flow account exists the causal chain is a reference; where it does not, the chain is an assertion by the tagging officer, and the metadata record should make clear which of the two it is.

¶5 A record satisfying **place alone** is tagged only where a marine benefit is identifiable and stated. Place is the weakest of the three tests and carries the greatest inflation risk, because in a coastal state a large share of all public activity occurs somewhere in the coastal zone. A system that admits place alone, without requiring a stated benefit, will tag a substantial part of the national budget and will be correct in a sense that serves nobody.

¶6 The stated benefit is what makes a place-only tag reviewable; the extent accounts are what make it testable. Such a tag asserts that expenditure in an administrative unit acts on the marine environment, and the ecosystem extent account for that unit records whether there is a marine or coastal asset there for it to act on. Where the crosswalk at Section 3.3.2 resolves the unit to a marine reporting unit with mapped extent under **TG-3.1 Asset Accounts**, the assertion has a referent an auditor can check without visiting the site; where it resolves to no marine unit at all, the tag rests on the officer's judgement alone and should be refused. This is the control that turns the weakest of the three tests into one with a documented failure condition, and it is available only where extent accounts have been compiled.

¶7 The ordering is not arbitrary: it tracks how far each test can be carried into an account. An activity-test tag resolves to an ocean economy industry and can be reconciled against **TG-3.3**. A purpose-test tag resolves to a CEPA or CReMA class and can enter the environmental protection expenditure account. A place-test tag resolves only to a location, which is why it needs a stated marine benefit before it means anything. Evidentiary strength and account-readiness are the same ordering seen from two directions.

¶8 Where a record satisfies none of the three tests it is not tagged, and the assessment is recorded rather than left as a null, so that "assessed and not ocean-related" and "not yet assessed" remain distinguishable.

3.3 Tagging public expenditure

3.3.1 Where the tag attaches

¶1 The attachment point in the chart of accounts determines everything the system can subsequently do, and it is the decision most often made by default.

¶2 **At programme level.** The tag attaches to a programme or sub-programme in the budget classification. This is the cheapest option – no change to transaction processing, and where most climate budget tagging sits. Its cost is that a programme is rarely wholly ocean-related, so proportional treatment does all the work, location is limited to whatever geography the programme reports, and the tagged figure cannot be traced to execution.

¶3 **At activity or project level.** The tag attaches one level below programme. Ocean relevance is far more often uniform at this level, so proportions are needed less often and are better founded when used. Most capital expenditure and most donor-funded activity already carries a project identifier, and a project usually has a location.

¶4 **At transaction level.** The tag attaches to individual commitments and payments in the treasury system. This gives execution data and full auditability, and it requires either a change to the financial management information system or a manual coding burden that in most settings will not be sustained.

¶5 The choice is also a choice about which accounts the tag can ever reach. A programme-level tag can populate a functional presentation and little else. An activity-level tag carries a purpose and a location, so it can reach the environmental protection expenditure account and, through the crosswalk, the ecosystem accounts. A transaction-level tag additionally distinguishes commitment from payment, which is what an account compiled on an accrual basis needs.

¶6 The recommendation is to attach at **activity or project level** and inherit upward to programme. That yields a tagged envelope reportable at any level of the budget classification whilst remaining

traceable to an identifiable activity with a location. Systems beginning at programme level should treat migration to activity level as a planned second phase, not a later improvement, because location cannot be retrofitted to historical programme-level tags.

3.3.2 The dimensions of a blue tag

¶1 A blue tag is not a single flag. It carries four dimensions, each answering a different question and each mapping to something the accounts already hold. Table 3 sets them out.

¶2 **Table 3: The four dimensions of a blue tag**

Dimension	Question it answers	Classification used	Where it maps in the accounts
Function	Which government function is this?	COFOG, per TG-3.7 Section 3.3.5, Table 3.7.7	Government expenditure by function; the ocean-share benchmark
Purpose	What is the expenditure for?	CEPA for protection, CReMA for resource management, and a national blue economy objective classification for productive expenditure ⁵	Environmental protection expenditure account, SEEA CF Chapter 4
Place	Where does it act?	The budget system's own location classification, plus the crosswalk below	Ecosystem extent and condition accounts, TG-3.1 Asset Accounts
Extent	How much of the line is ocean-related?	Component, measured share or coefficient, in that order (Section 3.3.3)	Nothing directly. See Section 3.3.3

¶3 Tying the function and purpose dimensions to established classifications rather than to a bespoke list is what makes the output comparable, and there is precedent for it in an adjacent domain: BIOFIN's Global Biodiversity Expenditure Taxonomy classifies public biodiversity expenditure into nine primary categories with attribution rates tied to governmental functions.³

¶4 **The place dimension, and what is actually missing.** A well-designed chart of accounts already carries a location code. Where a unified budget classification exists, it commonly includes a location segment reaching local-government level and coded to the national statistical geographic standard, and climate expenditure tags have been applied through such codes for around a decade.⁶ Compilers should not assume they need to build a spatial identifier; in many jurisdictions they need to use the one that exists.

¶5 The gap is elsewhere, and it is specific: **a barangay code does not locate a reef.** Administrative geography and ecosystem reporting units are different partitions of space. Marine and coastal accounting units follow habitat, depth, management area and fisheries management region – they neither nest within nor align to municipal boundaries. A great deal of ocean-relevant expenditure is coded to the coastal municipality from which a vessel, a ranger station or a project office operates, and not to the water it acts on.

¶6 The requirement is therefore a **maintained crosswalk between the budget system's location classification and the spatial units used by the ecosystem accounts**, covering at minimum three cases – which administrative units front which marine reporting units, how expenditure coded to a land unit but acting seaward is allocated, and how expenditure coded to a national or headquarters location is treated. The crosswalk is standing infrastructure, not a one-off mapping, and where the same statistical office maintains both the geographic standard and the ecosystem accounts, it is cheap to build and nobody has yet built it.

¶7 ⓘ **Worked instance: a location segment that already exists, and the correspondence that does not**

¶8 The Philippines is the most fully documented case, and two features transfer. Climate Change Expenditure Tagging has run since 2015 under Joint Memorandum Circular 2015-01, and tags are applied through Unified Accounts Code Structure codes, whose Location segment reaches barangay level under the Philippine Standard Geographic Code maintained by the national statistical office.⁶ A compiler there does not need to build a spatial identifier. The same circular also decomposes rather than weights, which is the warrant for the preference order at Section 3.3.3.⁷

¶9 The gap is the correspondence. The geographic standard locates a barangay; the ecosystem accounts report on habitat, depth stratum and management area; and nothing maps between them. Ocean accounting is what makes the gap visible and also what closes it, since the accounts define the marine reporting units the crosswalk has to reach. Country application belongs to the Section 5 case studies rather than to this Circular.

¶10 Where an activity genuinely has no location, such as a national fisheries policy unit or a marine science scholarship, the location is recorded explicitly as national. A null and a national are different statements, and conflating them breaks the join in Section 3.7.

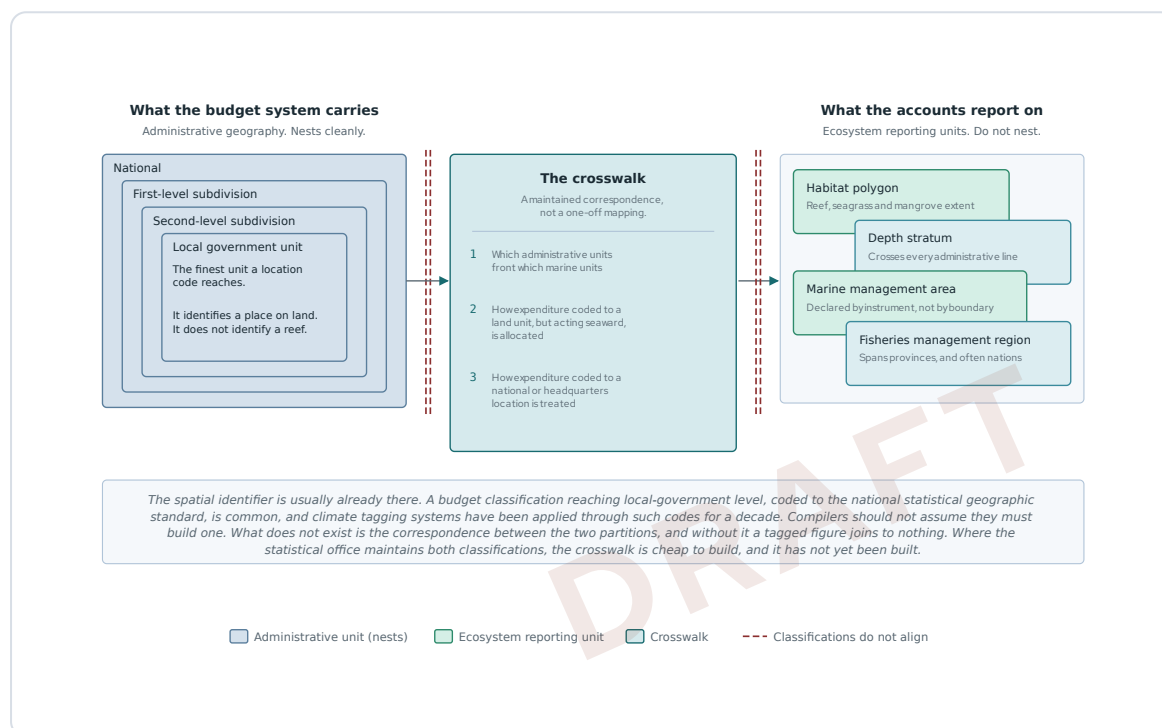


Figure 1.12.3 Administrative geography nests; ecosystem reporting units do not. A location code cannot identify a reporting unit on its own, so tagged expenditure reaches the accounts through a maintained crosswalk covering three cases.

Source: Illustrative of a budget classification carrying a location segment coded to a national statistical geographic standard: Government of the Philippines, Unified Accounts Code Structure, Location segment; Department of Budget and Management, Climate Change Commission and Department of the Interior and Local Government, Joint Memorandum Circular 2015-01, 24 March 2015, under which tags are applied through those codes.

Note: The administrative levels are drawn generically: every budget system carrying a location code faces the same non-alignment. The ecosystem units are drawn overlapping deliberately, because their failure to nest is the finding.

3.3.3 Establishing how much of a line is ocean-related

¶1 Most tagged budget lines are not wholly ocean-related. Three methods are available and they are not equivalent. They form a preference order, and a compiler should exhaust each before moving to the next.

¶2 **First, decompose.** Where the budget structure permits, identify the components of the programme, activity or project that are ocean-related and tag those components in full, leaving the remainder untagged. This is what established climate expenditure tagging instruments direct: where

addressing the objective is the main purpose, or one of the main purposes, of a programme, activity or project, the entire budget of that item is tagged, and otherwise the agency identifies only the components that directly address the objective and includes only those components' expenditure.⁷ Decomposition has a decisive property – it partitions an appropriation into amounts that remain amounts, so the result is additive, auditable against the budget, and free of any judgement about proportion.

¶3 Decomposition also has an accounting payoff that weighting destroys. Components identified this way can be classified straight to CEPA and CReMA classes and carried into the environmental protection expenditure account, because each is a whole amount with a single purpose. A coefficient applied across a mixed line produces a figure that belongs to no purpose class at all, and so cannot enter the account. Where a compiler decomposes once against the account structure, the decomposition is reusable in every subsequent year.

¶4 **Second, measure a share.** Where the line cannot be decomposed, derive a proportion from an operational quantity – the share of shoreline length treated, the share of vessel days in marine waters, the share of a research programme's funded projects with a marine subject. Record the derivation. A measured share is defensible in a way a convention is not, and it should be labelled as measured in the metadata record.

¶5 The quantities that make a share measurable are, in most cases, already compiled. A spatial proportion is derived from the areas and shoreline lengths in the extent accounts of **TG-3.1 Asset Accounts**; an activity proportion from the gross catch and extraction quantities in the physical flow accounts of **TG-3.2 Flows from Environment to Economy**, or from the spatially mapped vessel-days compiled under **TG-4.10 Extending Fisheries Statistics**; and an industry proportion from the output and employment aggregates of **TG-3.3**. A compiler holding these tables derives a proportion where a compiler without them must assign a coefficient, and that is the most direct contribution the accounts make to a tagging system: **account coverage determines how much of the tagged envelope rests on measurement and how much rests on convention**. It follows that the composition of the envelope by extent method, published under Section 3.3.4, is a coverage statistic for the accounts as much as a quality statistic for the tag, and a fall in the coefficient-derived share is the return on each additional account compiled.

¶6 **Third, assign a coefficient.** Only where neither of the above is possible, apply a documented ordinal scale. This is the method of the OECD DAC Rio markers, and the two properties a compiler should know about it are that the coefficients are not standardised – applied rates for the "significant" marker range across providers from zero to 100 per cent, with no common reporting standard – and that the marker system itself describes its output as "descriptive rather than strictly quantitative", allowing only "an approximate quantification".⁸

¶7 ⚠ **Coefficients have no empirical foundation**

¶8 An ordinal scale mapped to percentages is a convention adopted for tractability. This is visible in the adjacent domain as well: BIOFIN published its biodiversity expenditure taxonomy in 2024 with the attribution rates themselves marked for a future version.³ A compiler using coefficients should record that they are adopted as a convention, and should not present a coefficient-weighted figure as an estimate of ocean expenditure.

¶9 **The two-figure rule, and where it applies.** A figure produced by coefficients is not additive with any fiscal aggregate. The amounts appropriated are whole amounts, and applying a 50 per cent coefficient to a line does not create a 50 per cent appropriation, so a sum of coefficient-weighted lines corresponds to nothing in the budget, the treasury ledger or government finance statistics.⁹ Where any coefficient has been applied, two figures are published:

- ¶10 The **tagged envelope**: the unweighted sum of all appropriations carrying a blue tag. Additive, reconcilable with the budget, auditable. It overstates ocean expenditure – inspectably, because the composition by method and by boundary test is published with it. This is the same object the DAC presents as the "upper bound" of environment-related finance.⁸

- ¶11 The **weighted estimate**: the sum after coefficients. An indicator, and not an expenditure aggregate.

¶12 Publishing the weighted estimate alone is the most common defect in existing tagging systems, and it produces a figure that no auditor can confirm and no analyst can decompose. Where a system has reached full decomposition, the two figures converge and the rule costs nothing, which is a further reason to prefer decomposition.

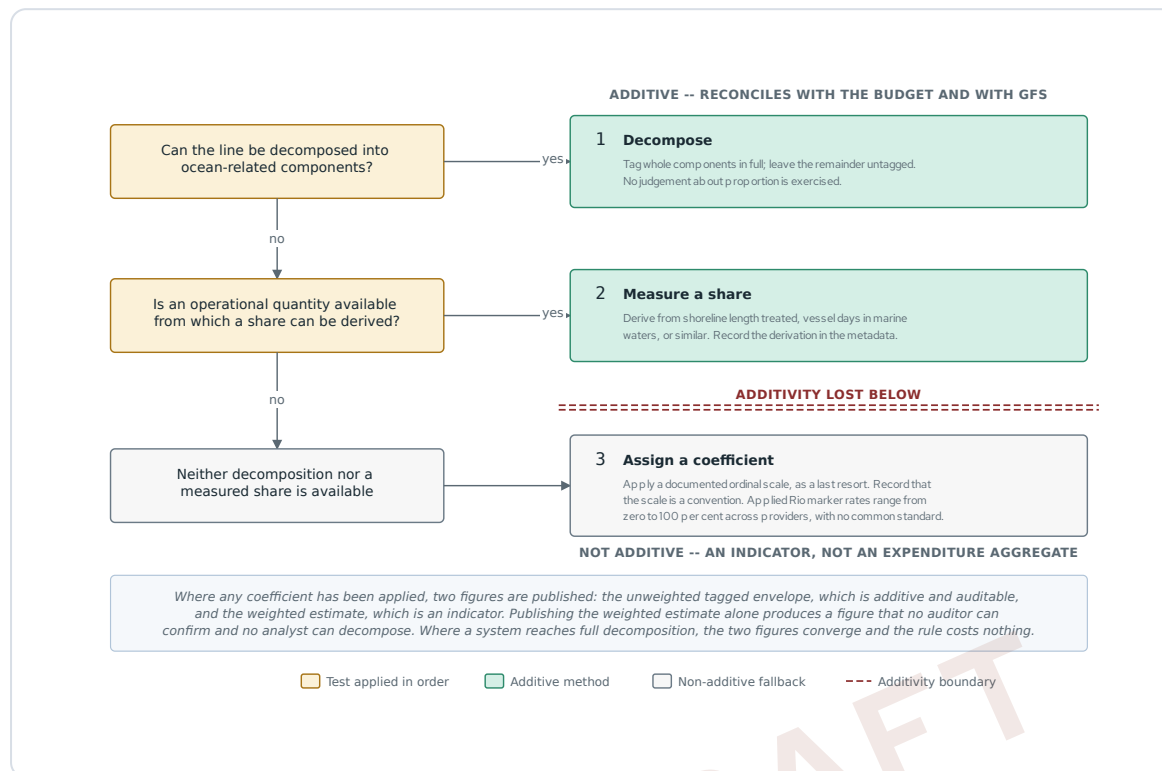


Figure 1.12.2 Three methods for establishing how much of a budget line is ocean-related, applied in order of preference. Decomposition and measured shares keep the result additive with fiscal aggregates. Coefficients do not, and where one is used the two-figure rule applies.

Source: Department of Budget and Management, Climate Change Commission and Department of the Interior and Local Government (Philippines), Joint Memorandum Circular 2015-01, *Revised Guidelines for Climate Change Expenditure Tagging*, 24 March 2015, Annex A, Step 2 (decomposition rule); OECD Development Assistance Committee, *Rio Markers for Climate: Handbook* (marker scale, and the description of markers as descriptive rather than strictly quantitative); OECD, survey of coefficients applied to Rio-marked flows (range across providers).

Note: The order is a preference order, not a classification of jurisdictions. A single tagging system will use all three methods across different budget lines, and the metadata record at Section 3.8.1 states which method was applied to each. The boundary marks a property of the arithmetic, not a quality judgement about the third method.

3.3.4 Institutional arrangements, and tag inflation

¶1 Three roles must be distinct.

¶2 **The tagger** is normally the spending agency, the only party with knowledge of the activity. Tagging by a central agency from budget documents alone produces weaker tags, because the documents rarely contain what the purpose and place dimensions need.

¶3 **The rule-setter** is the finance or planning ministry, which issues the tagging guidance, the boundary definition, the classification lists and the crosswalk. Where agencies set their own rules the resulting aggregate is not comparable across agencies or across years.

¶4 **The verifier** is independent of the spending agency. Its function is to sample, to test tags against the documented rule, and to publish an error rate. A system that publishes no error rate

asserts a precision it has not established. Established tagging instruments attach a formal quality assurance review to the tagging cycle, which is a workable model.⁷

¶5 **Tag inflation** is the characteristic pathology, and it is a rational response to incentives. Where tagged expenditure attracts political credit, counts toward an international commitment, or improves access to concessional finance, agencies will tag generously, and the inflation will appear in the tests that admit the most judgement. Four controls are available and none is sufficient alone:

- ¶6 Require the causal chain to be documented for every purpose-only and place-only tag, so a generous tag is at least a reviewable one.
- ¶7 Publish the composition of the tagged envelope by boundary test and by extent method, so a drift toward the weaker tests is visible in the output.
- ¶8 Sample and publish an error rate, as above.
- ¶9 Compare the tagged envelope against the apportioned estimate compiled under **TG-3.7 Section 3.3.5** annually, and explain divergence. This is the only check that does not depend on the tagging system's own procedures.

¶10 The last of these is why the accounts belong in the institutional design and not only in the methodology. A tagging system whose only reference point is itself will drift, and the environmental protection expenditure account and the COFOG-based ocean share are compiled by a statistical office with no interest in the tagged total. Assigning the annual comparison to that office, rather than to the finance ministry or the spending agency, gives the arrangement an external anchor that no amount of internal sampling supplies.

3.4 Tagging finance flows

¶1 The second application of the same operation classifies financial instruments and the activities they finance. The classification decision is made by a lender, an issuer, a verifier or a regulator, and the tests it applies are set by a sustainable finance taxonomy where the jurisdiction has one.

3.4.1 What a screening criterion asks of the accounts

¶1 A taxonomy performs two functions: **definition**, which activities are eligible, on what tier, subject to which do-no-significant-harm tests and exclusions; and **disclosure**, what the financed entity must report about the environmental characteristics of what it does. Each is a measurement problem before it is a regulatory one.

¶2 Taxonomies with a marine sector are recent, few and unaligned. The ASEAN Taxonomy for Sustainable Finance completed technical screening criteria across the focus and enabling sectors of its Plus Standard in its fourth version, with a multi-tier structure framed to accommodate the differing development stages of member states.¹⁰ Indonesia's national taxonomy acquired technical screening criteria for fisheries and marine activities in its third version, classifying an activity as green, as transitional, or as neither, and applying the full criteria only to the corporate non-MSME segment whilst offering a simplified decision tree to the remainder.¹¹ Coverage elsewhere is partial: the European Union taxonomy carries an environmental objective on the sustainable use and protection of water and marine resources, and market guidance exists for bonds financing the sustainable blue economy and in the Climate Bonds Initiative marine criteria.¹² No international blue finance taxonomy exists.

¶3 One methodological consequence matters more than the rest. A **tiered** criterion is more data-intensive than a binary one – a binary test asks whether an activity appears on a list, whilst a tiered test asks where on a gradient a particular asset sits, which requires the asset to be measured, spatially explicitly, by a recognised method, and repeatedly. A criterion expressed as improvement, or as a threshold sustained over time, cannot be evaluated against a single survey. It requires a time series, which is what an account compiled on a cycle is and what a commissioned baseline study is not.

¶4 **The compilation task.** A compiler serving taxonomy users should build and maintain a correspondence table with one row per applicable screening criterion, recording: the account table that supplies the evidence; whether a snapshot exists for it; and whether a repeat-observation series exists for it. On the asset side, resource stocks map to the SEEA Central Framework categories and ecosystem assets to the reference typology used in **TG-3.1 Asset Accounts**, and any divergence between a national ecosystem typology and the reference classification is documented explicitly, since the comparability of resulting disclosures depends on it. On the disclosure side, extent accounts with protected-area overlays serve location-of-assets disclosure, condition accounts serve dependency and impact assessment, physical flow accounts serve pressure metrics, and investment indicators serve nature-related finance metrics; the route by which a reporting entity consumes national accounts is set out in **TG-1.11 Section 3.2**.

¶5 The distance between the two ratings in that table – criteria with a snapshot against criteria with a series – is the finding most worth publishing, because it states exactly which criteria the jurisdiction can currently evidence and which it cannot.

3.4.2 Use-of-proceeds and performance-linked instruments

¶1 Two instrument structures carry a blue tag and they mean different things.

¶2 A **use-of-proceeds** instrument commits the issuer to spending the proceeds on a defined list of eligible activities. The tag attaches to the proceeds, the reporting obligation is an allocation report, and the evidence required is an eligibility determination for each financed activity, made at issuance.

¶3 A **performance-linked** instrument commits the issuer to a measured outcome, with a financial consequence if the outcome is not met. The tag attaches to performance against a key performance indicator, and the proceeds are unrestricted. The evidence required is a baseline, a target, and an independently produced series capable of showing whether the target was met.

¶4 Aggregating the two destroys the distinction that a user of the figure most needs. A blue finance total mixing them states neither how much money was directed to marine activity nor how much marine outcome was contracted for. **Use-of-proceeds and performance-linked instruments are reported separately.**

¶5 This is the point at which the accounts stop being a reference and become the instrument. An account table compiled on a cycle is well suited to serve as the performance metric in a performance-linked instrument, because it is independently produced, independently verifiable, and outside the issuer's control. That is a stronger position than the bespoke monitoring such instruments ordinarily rely on, and it is available only where compilation is recurrent (Section 3.9).

3.4.3 An interim convention where no taxonomy applies

¶1 Most jurisdictions have no applicable marine taxonomy, and comparable blue finance figures are still needed. The three-tier convention in Table 4, adopted from GOAP Secretariat material prepared for national planning use, allows publication without waiting for taxonomy harmonisation.¹³

¶2 **Table 4: Interim blue finance classification convention**

Tier	Basis
Self-labelled	Presented by the issuer or borrower as blue, green or sustainable, with no external confirmation
Verified	A subset of the above, where a second-party opinion provider or a recognised certification scheme has confirmed alignment with a published standard
Criteria-documented	No applicable taxonomy or verification exists in the jurisdiction, and the compiler records the use-of-proceeds, the activity list and the exclusion list applied

¶3 Every figure published under this convention carries a metadata record covering instrument type, issuer and sector, jurisdiction, taxonomy or criteria applied, verification status, whether the instrument is use-of-proceeds or performance-linked, the reporting period, and whether the figure is a stock or a flow, consistent with **TG-2.6**.

¶4 The third tier is where ocean accounting does the most work. Where no taxonomy applies, the compiler has to document the criteria applied, and an account table is the most defensible thing to document them against: extent and condition for the asset financed, and a compilation date establishing that the evidence is current. A criteria-documented figure anchored to a published national account is a materially stronger disclosure than one anchored to a consultant's baseline study, and it costs less at the second use.

¶5 The tiers are reported separately and never summed into a single blue finance figure. A self-labelled total and a verified total answer different questions, and a reader who cannot see the split cannot tell which question the number answers.

3.5 Reconciling the two aggregates

¶1 The tagged public expenditure envelope of Section 3.3 and the blue finance total of Section 3.4 are drawn from different populations and answer different questions. The first is an **expenditure view** – what was spent, and on what. The second is a **financing view** – where money came from, and on what terms. They overlap, and the overlap is largest in exactly the jurisdictions most likely to publish both.

¶2 Three overlaps recur.

¶3 **Sovereign issuance.** Where a government issues a blue bond, the proceeds are appropriated and executed as public expenditure. The same money appears once in the blue finance total as an instrument and again in the tagged envelope as expenditure. It is one flow counted twice.

¶4 **On-lending and public financial institutions.** Where a national development bank lends to a private borrower using sovereign-guaranteed funds or an on-lent multilateral facility, the same underlying capital can be counted at the multilateral disbursement, at the sovereign appropriation, and at the sub-loan.

¶5 **Budget support and grants.** External finance recorded as an ocean-related grant by the provider is, in the recipient's accounts, an appropriation, and where the recipient tags it, it appears in both.

¶6 The rule is simple and is violated routinely: **the two aggregates are never summed**. A country wishing to publish a single ocean finance figure must publish a bridge, and the bridge has an elimination line. Table 5 gives the minimum structure.

¶7 **Table 5: Bridge between the financing view and the expenditure view**

Line	Content	Sign
A	Blue finance raised, by instrument, from the classification in Section 3.4	+
B	Of which raised by general government and appropriated	memorandum
C	Domestic public appropriation carrying a blue tag, the tagged envelope from Section 3.3	+
D	Less: line B, to remove the double count between A and C	-
E	Private and non-appropriated finance not captured in A, where separately identified	+
F	Total ocean-related finance, with the eliminations at B and D disclosed	=

¶8 The bridge is built on the unweighted envelope, for the reason given at Section 3.3.3. A bridge built on coefficient-weighted figures reconciles nothing, because neither side corresponds to a payable amount.

¶9 Both sides of the bridge have an account counterpart, which is what keeps it from being an arbitrary reconciliation. The expenditure view resolves to the environmental protection expenditure account and the COFOG-based functional presentation. The financing view resolves to the supplementary “of which” classification of financial instruments measured in **TG-2.6**. The elimination at line B is therefore not a plug; it is the amount that appears in both account presentations, and a compiler who can locate it in each has demonstrated that the bridge closes.

¶10 Where a compiler cannot identify line B, the bridge cannot be constructed, and the two aggregates are published separately with a note stating that they overlap by an unquantified amount. That is an honest presentation, and a single summed figure is not.

3.6 Blue tags alongside climate and biodiversity tags

¶1 Where a government already runs climate expenditure tagging, and increasingly biodiversity tagging alongside it, a blue tag lands on records that are already tagged. That overlap is the expected result, and the only error available is to treat it as a conflict.

¶2 **Tag dimensions are orthogonal, not a partition.** A mangrove rehabilitation appropriation is legitimately climate-relevant on both mitigation and adaptation grounds, and biodiversity-relevant, and blue-relevant. Forcing a single classification would require the compiler to discard true information.

¶3 This is settled practice in the oldest tagging system in existence, and this Circular applies it rather than proposing it. The OECD DAC Rio marker handbook is explicit: activities may qualify for more than one marker, and to avoid double or triple counting the same activity, “aggregate figures for biodiversity, climate change mitigation, climate change adaptation and desertification-related development finance should not be added up”, with statistical presentations either prepared for one marker at a time or presenting the overlap explicitly.⁸

¶4 Two requirements follow for a blue tag.

¶5 **Tag aggregates are never summed across dimensions.** Adding a climate total to a biodiversity total to a blue total counts the mangrove line three times and has no interpretation.

¶6 **Intersections are published.** A blue tagging system operating alongside others reports a cross-tabulation of the tagged envelope, at minimum distinguishing blue-only, blue and climate, blue and biodiversity, and all three. The intersection cells usually carry more policy content than any single-tag total, because they identify the expenditure serving several national commitments at once, which is the expenditure a finance ministry is most interested in protecting through a consolidation.

¶7 The intersection table is itself an account presentation, and should be built as one. Combined presentations in **TG-3.8** exist precisely to set several classifications against a common population without summing them, and a blue-climate-biodiversity cross-tabulation is that structure applied to appropriations. Building it as a combined presentation rather than as a spreadsheet has a practical consequence: the intersection can then be carried into the accounts alongside the expenditure it describes.

¶8 Where the same record carries different extents in different tagging systems, the discrepancy is disclosed and not reconciled. The systems answer different questions, and there is no reason the shares should sum to anything in particular.

3.7 Joining tagged expenditure to the accounts

¶1 This section is the payoff of the crosswalk requirement at Section 3.3.2.

¶2 The join is between two tables. On one side, tagged expenditure aggregated by spatial unit, purpose class and period. On the other, the ecosystem extent and condition accounts for the same units and periods, compiled per **TG-3.1 Asset Accounts** and the relevant Section 6 thematic circulars. Four conditions make it possible, and all four are design choices:

1. ¶3 The crosswalk at Section 3.3.2 exists and is maintained, so budget location codes resolve to ecosystem reporting units.
2. ¶4 Expenditure is accumulated over time as well as reported annually, because ecosystem responses do not follow appropriation years.
3. ¶5 The purpose classification is common to both sides, which it is where CEPA and CReMA are used.
4. ¶6 Both sides record their vintage, so a condition observation is not silently compared against expenditure from a later period.

3.7.1 What the join licenses

¶1 The join supports **description**. It states that a given quantum of blue-tagged expenditure, of a given purpose composition, occurred in a spatial unit over a period, and that the unit's ecosystem extent and condition changed by a measured amount over a related period. That is a coincidence of two measured series, and it is worth publishing on its own.

¶2 The join does not support **attribution**. It does not establish that the expenditure caused the change, and a compiler presenting it as though it did will be wrong in the common case, because condition changes are driven overwhelmingly by pressures the expenditure did not address. Attribution requires a counterfactual, and the designs available – control sites, before-after-control-impact, matching, regression discontinuity – are set out in **TG-1.3 Section 3.4.3** and applied to intervention accounting in **TG-6.15 Ocean Accounting for Nature-based Solutions**. Tagging supplies the expenditure series those designs need, and substitutes for none of them.

3.7.2 The most useful output is a gap

¶1 A joined table most reliably identifies **spatial units where ecosystem condition is declining and blue-tagged expenditure is absent or negligible**, and the converse, units carrying substantial expenditure with no condition series against which anything can be assessed.

¶2 Neither finding requires a causal claim, both are robust to the attribution limit above, and both are directly actionable: the first is a budget allocation question, and the second is a measurement programme question. The second is also a commissioning instrument for the accounts themselves. A list of spatial units carrying material blue-tagged expenditure and no condition series is a costed, prioritised case for extending ecosystem account coverage, addressed to the ministry already spending money there. A compiler producing nothing else from this Circular should produce these two lists.

3.8 Metadata and quality assurance

3.8.1 The tag metadata record

¶1 A tag without metadata is an assertion. Table 6 specifies the minimum record retained for every tagged line.

¶2 **Table 6: Minimum tag metadata record**

Field	Content
Boundary test satisfied	Activity, purpose, place, or a combination, per Section 3.2
Causal chain	Required where the tag rests on purpose or place alone. A short statement of the pathway to a marine outcome

Field	Content
Extent method	Component decomposition, measured share, or coefficient, per Section 3.3.3, with the derivation recorded for a measured share
Location	The budget system's location code, the ecosystem reporting unit it resolves to under the crosswalk, and an explicit national where the activity has no location
Purpose class	CEPA, CReMA or national blue economy objective class
Tagger	The agency and role that applied the tag, and the date
Verification status	Untested, sampled and confirmed, sampled and corrected
Rule version	The version of the tagging guidance under which the tag was applied

¶3 Each field exists because an account consuming the tag needs it. Purpose class and location are what the EPEA and the ecosystem accounts read directly. Extent method and relevance basis are what allow an account compiler to decide whether a tagged amount may enter an aggregate at all, since a coefficient-derived figure may not. Verification status and tagger identity carry the provenance that **TG-0.7** requires of any input to a published account.

¶4 The **rule version** field is most often omitted and is what makes a time series usable. Tagging rules are revised, and a tagged envelope compiled under a 2027 rule is not comparable with one compiled under a 2025 rule unless the change is recorded and, where material, the earlier series restated.

3.8.2 Quality assurance

¶1 The quality dimensions in **TG-0.7 Quality Assurance Principles** apply, and three of them bite particularly.

¶2 **Accuracy** is assessed by sampling. The verifier draws a sample of tagged lines, re-applies the published rule independently, and publishes an error rate with its confidence interval. Errors are reported in both directions – incorrectly tagged, and incorrectly untagged. A system sampling only tagged lines will never detect under-coverage, which in a first year of operation is usually the larger error.

¶3 **Comparability over time** is protected by the rule version field and by restatement when rules change materially. Its main threat is budget classification reform, which is common and which severs the link between a historical tag and any current budget line. A crosswalk between successive budget classifications should be maintained deliberately, alongside the spatial crosswalk at Section 3.3.2.

¶4 **Coherence** is assessed against the apportioned estimate compiled under **TG-3.7 Section 3.3.5**, annually, and against the environmental protection expenditure account for the purpose-classified subset. This is the external check, and the only quality assurance step whose result does not depend on the tagging system's own procedures.

3.9 Implementation pathway

¶1 The requirements above are not all attainable at once. Three tiers describe what a country can produce given what it has, following the compilation pathway convention used elsewhere in this publication.¹⁴ The tiers describe capability, not ambition: a country at the foundational tier should design for the advanced tier from the start, because the four choices at Section 3.1.2 are cheap now and unrecoverable later.

¶2 **Foundational.** Tags attach at programme level, with the function and purpose dimensions and whatever extent method the budget structure supports. The tagged envelope is published, with its composition by boundary test and extent method, and the weighted estimate alongside it wherever coefficients have been used. No crosswalk, therefore no join to the accounts. The output is a defen-

sible expenditure figure and a coverage baseline. It requires the tagging guidance itself, a coding exercise during formulation, and the willingness to publish two figures.

¶3 **Developing.** Tags attach at activity or project level. The crosswalk is built for capital works, protected area management and area-based programmes, which will typically cover most of the envelope by value. Verification sampling begins and an error rate is published. The bridge to the financing view is attempted where sovereign issuance exists. The output additionally supports the gap analysis at Section 3.7.2 for the covered subset. It requires a change to the budget classification or the activity register, and a verification function with a mandate.

¶4 **Advanced.** Tags attach at activity level with execution data from the treasury system and carry the full metadata record at Table 6. Crosswalk coverage is complete, including explicit national coding. Cumulative expenditure series by spatial unit are maintained. Tag intersections with climate and biodiversity systems are published. The joined table at Section 3.7 is produced annually alongside the accounts. It requires a financial management information system able to carry the tag through execution, and recurrent compilation of the ecosystem accounts on the other side of the join.

¶5 The binding constraint at every tier is the second item on that last list. A tagging system can be built in one budget cycle; an account it can be joined to requires compilation on a cycle, and the GOAP Secretariat's observation from country programmes is that the difficult step for a national accounting initiative is the second compilation and not the first.¹³ Where the ecosystem accounts are compiled once as a pilot, the advanced tier is unattainable however good the tagging system is, and the tagging system will in time be judged on outputs it was never able to produce.

4. Limitations and Considerations

¶1 **Tagging measures intent, not effect.** A tagged appropriation records what a government decided to fund and for what stated purpose. It records nothing about whether the money was well spent, whether the activity was completed, or whether anything in the marine environment changed. Section 3.7 sets out how far the accounts take a compiler beyond intent, and it is not far without a counterfactual.

¶2 **Coefficients have no empirical foundation.** Where Section 3.3.3's third method is used, the resulting figures should not be described as estimates of ocean expenditure, and should not be compared across jurisdictions applying different scales. Applied Rio marker coefficients already range from zero to 100 per cent across providers with no common standard.⁸

¶3 **Coverage is bounded by the budget.** Blue tagging observes appropriated public expenditure. It does not observe extrabudgetary funds, state-owned enterprise expenditure outside the budget, unconsolidated sub-national own-source expenditure, or in-kind contributions. In several ocean-relevant domains, notably port authorities and fisheries agencies operating on retained revenue, the unobserved share may be substantial and should be estimated and disclosed.

¶4 **The finance side rests on jurisdictional taxonomies that do not align.** A blue finance figure classified under one national taxonomy is not comparable with one classified under another, and the interim convention at Section 3.4.3 makes the incomparability visible without resolving it. No international blue finance taxonomy exists, and this Circular does not propose one.

¶5 **Tagging systems are political instruments.** Where the tagged figure carries consequences it will be gamed, and the controls at Section 3.3.4 reduce that without eliminating it. A tagged envelope that grows rapidly without a corresponding change in the budget should be investigated as a tagging phenomenon before it is reported as a policy achievement.

¶6 **The Circular is badged Emerging.** No adopted international standard governs the tagging of expenditure or finance as ocean-related, and ocean-specific practice is thin (Section 3.1.1). The

classifications relied on here – COFOG, CEPA, CReMA, the SEEA structures – are standards; the way they are assembled into a tag is not, and it should be expected to change as practice develops.

5. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

6. References

1. ¶1 World Bank, *Blue Public Expenditure Review Guidance Note*, 2021, and the accompanying *Guidance Note for a Blue Public Expenditure Review*, PROBLUE Knowledge Factsheet Series 3, February 2022. The guidance note structures a Blue PER around six questions covering scope, expenditure data, adequacy and sustainability, efficiency, accountability and equity, and directs that the scope boundary be “decided in close consultation with the client”, either narrow, covering coastal and marine-specific activities alone, or wide, extending to non-coastal activities that indirectly affect the potential for a blue economy.
2. ¶2 Ibid., footnote 6, which notes that natural capital accounts, where available, can indicate the extent to which the benefits of coastal and marine ecosystems accrue to those who manage them. This is the only reference to accounts in the guidance note.
3. ¶3 BIOFIN, *Global Biodiversity Expenditure Taxonomy*, UNDP, October 2024, which classifies public biodiversity expenditure into nine primary categories with subcategories and expenditure programmes, associated with biodiversity attribution rates tied to governmental functions. The published guidance records that the attribution rates themselves are to be added in a future version. On climate, SDG and green budget tagging generally, see UNDP, *SDG Budget Tagging*, 2024, and OECD work on green budget tagging.
4. ¶4 UNDP, *Ocean for Development*, 2025, which lists green and blue public budget tagging among ocean finance instruments, described as aligning national budgets with marine conservation by tagging expenditures that support SDG 14 and marine biodiversity, and naming Blue Economy Budget Tagging in Indonesia alongside the Blue Economy Roadmap as its example. The method of the Indonesian system is not publicly documented at the time of writing and is not described here.
5. ¶5 SEEA Central Framework, Chapter 4, environmental activity accounts and related flows, covering the environmental protection expenditure account, the Classification of Environmental Protection Activities (CEPA 2000) and the Classification of Resource Management Activities (CReMA). Paragraph citations to be added.
6. ¶6 The worked instance is the Philippines: the Unified Accounts Code Structure carries a Location segment providing codes for region, province, city or municipality and barangay in accordance with the Philippine Standard Geographic Code prescribed by the Philippine Statistics Authority, and climate change expenditure tags are applied through those codes under the instrument at footnote 7. It is cited because it is the most fully documented instance available, and the structure it illustrates – a unified budget classification carrying a location segment referenced to a national geographic standard – is common to many public financial management systems. Country application belongs to the Section 5 case studies rather than to this Circular.
7. ¶7 Department of Budget and Management, Climate Change Commission and Department of the Interior and Local Government, Joint Memorandum Circular 2015-01, *Revised Guidelines for Climate Change Expenditure Tagging*, 24 March 2015, amending Joint Memorandum Circular 2013-01. Annex A, Step 2 directs that where addressing climate change is the main objective or one of the main objectives of a programme, activity or project, the entire budget is tagged, and that where the objective does not explicitly articulate it, only the components directly addressing climate change are identified and only those components’ expenditure included. Annex B carries the climate change typologies; the instrument also provides for a quality assurance review.
8. ¶8 OECD Development Assistance Committee, *Rio Markers for Climate: Handbook*. The handbook states that the markers “apply to activities as a whole, and, in marking the full value of the activities the markers are considered descriptive rather than strictly quantitative”, allowing “an approximate quantification”, with principal and significant flows presented separately and their sum referred to as the “total” or “upper bound” of environment-related development finance. On aggregation across markers it states that “aggregate figures for biodiversity, climate change mitigation, climate change adaptation and desertification-related development finance should not be added up”, and that presentations should either cover one marker at a time or present and treat the overlap. On coefficients, see OECD, results of the survey on the coefficients applied to Rio-marked flows, recording applied rates for the significant marker ranging from zero to 100 per cent across providers with no common reporting standard.
9. ¶9 IMF, *Government Finance Statistics Manual 2014*. Paragraph citation for the additivity of expenditure aggregates to be added.
10. ¶10 ASEAN Taxonomy Board, *ASEAN Taxonomy for Sustainable Finance*, Version 4, 6 November 2025. To be confirmed against the primary document.
11. ¶11 Otoritas Jasa Keuangan, *Taksonomi untuk Keuangan Berkelanjutan Indonesia*, Version 3, issued 5 February 2026, carrying technical screening criteria for the fisheries and marine sub-sector within the expanded agriculture, forestry and fishing sector. Description drawn from GOAP Secretariat material which marks its own account as indicative; to be confirmed with OJK.

2. ¶12 European Union, Regulation 2020/852, environmental objective on the sustainable use and protection of water and marine resources; ICMA and partners, guidance on bonds financing the sustainable blue economy; Climate Bonds Initiative marine criteria. Titles, publishing partners and dates to be confirmed.
3. ¶13 Global Ocean Accounts Partnership Secretariat, brief prepared for the Ministry of National Development Planning of Indonesia (BAPPENAS), version 2.0. Table 3 of that brief supplies the three-tier convention, reproduced here with its structure retained; Section 6 supplies the observation on recurrent compilation.
4. ¶14 The foundational, developing and advanced framing follows the compilation pathway convention used in [TG-2.6 Section 3.5](#), which distinguishes what a compiler can produce given available data from the scope a compilation targets.

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