

Structure and Function of the Ocean Economy

Compiles indicators characterising the structure and function of the ocean economy: sector composition by industry classification.

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

After working through this Circular, readers will be able to compile indicators characterising the structure and function of the ocean economy: sector composition by industry classification, sectoral shares of gross value added (GVA) and employment, growth and productivity indicators, net ocean GVA adjusted for resource depletion, and trade and investment patterns. The guidance also provides a step-by-step compilation procedure for extracting ocean economy sub-matrices from national supply and use tables and deriving structural indicators from them.

The guidance responds to high demand from governments seeking to characterise their ocean economies for national budget processes, economic planning, and international reporting—including reporting against Sustainable Development Goal 14 (Life Below Water), particularly target 14.7 on economic benefits from sustainable use of marine resources. These indicators build directly on the ocean economy thematic and extended accounts described in [TG-3.3 Economic Activity Relevant to the Ocean](#) and support applications in national budget processes addressed in [TG-1.1 OA and National Budget Processes](#). The relationship between ocean economy structure and multilateral environmental agreement indicators, including SDG 14, is addressed further in [TG-2.10 MEA Indicators](#).

CONTENTS

1. Outcome 3

2. Requirements 3

3. Guidance Material 3

 3.1 Ocean Economy Structure Framework 4

 3.2 Sector Composition Indicators 7

 3.3 Growth and Productivity Indicators 11

 3.4 Net Ocean GVA 12

 3.5 Employment Structure 13

 3.6 Trade and Investment Indicators 15

 3.7 Compilation Procedure 17

 3.8 Compilation Considerations 18

4. Acknowledgements 19

5. References 19

ABOUT THIS CIRCULAR

RECOMMENDED CITATION

Structure and Function of the Ocean Economy (2026) (GOAP Technical Guidance on Ocean Accounting, TG-2.5, v0.9.1). GOAP Secretariat.
<https://guidance.oceanaccounts.org/circulars/section-2/2-5-ocean-economy-structure/>

© 2026 Global Ocean Accounts Partnership. Licensed under CC BY-NC 4.0.

DRAFT

1. Outcome

¶1 After working through this Circular, readers will be able to compile indicators characterising the structure and function of the ocean economy: sector composition by industry classification, sectoral shares of gross value added (GVA) and employment, growth and productivity indicators, net ocean GVA adjusted for resource depletion, and trade and investment patterns. The guidance also provides a step-by-step compilation procedure for extracting ocean economy sub-matrices from national supply and use tables and deriving structural indicators from them.

¶2 The guidance responds to high demand from governments seeking to characterise their ocean economies for national budget processes, economic planning, and international reporting—including reporting against Sustainable Development Goal 14 (Life Below Water), particularly target 14.7 on economic benefits from sustainable use of marine resources. These indicators build directly on the ocean economy thematic and extended accounts described in **TG-3.3 Economic Activity Relevant to the Ocean** and support applications in national budget processes addressed in **TG-1.1 OA and National Budget Processes**. The relationship between ocean economy structure and multilateral environmental agreement indicators, including SDG 14, is addressed further in **TG-2.10 MEA Indicators**.

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-3.3 Economic Activity Relevant to the Ocean** – for the methodological framework for compiling ocean economy thematic and extended accounts, including industry classifications and supply and use tables

¶4 Helpful background:

- ¶5 **TG-0.2 Overview of Relevant Statistical Standards** – for the international statistical standards underpinning ocean accounting, including the SNA 2025, SEEA, ISIC classification, and the methodological principles that govern thematic and extended accounts

¶6 ⓘ Framework Position

¶7 This Circular addresses how ocean accounts characterise the structure of the ocean economy through monetary flows between economic sectors and ocean-related assets. 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

3. Guidance Material

¶1 Governments preparing national budgets need to demonstrate the ocean economy's contribution to GDP, employment, and exports (**TG-1.1 OA and National Budget Processes**). Budget officials require quantified evidence of a sector's contribution to national income and employment to assess the rationale for public expenditure on ocean management, fisheries governance, port infrastructure, and marine environmental protection. The indicators in this Circular provide the analytical tools for these assessments, translating the detailed accounting data compiled under **TG-3.3** into policy-ready metrics that can populate the budget presentation structures described in TG-1.1

Section 3.3. Specifically, TG-1.1 identifies a four-row indicator structure—GDP contribution, employment, exports, and fish protein supply—that budget submissions should address; the indicator derivation methods in this Circular set out how compilers produce each of these figures from ocean economy accounts.

¶2 This Circular presents a framework for deriving structural and functional indicators from ocean economy accounts. The approach follows established practices from the System of National Accounts (SNA 2025)¹, draws on analogous approaches developed for tourism in the Statistical Framework for Measuring the Sustainability of Tourism (SF-MST)², and builds on the ocean economy thematic and extended accounting methodology described in the SEEA Ecosystem Accounting³. The SF-MST is a useful analogue because, like ocean economy measurement, tourism measurement involves delineating a functional segment of the economy that cuts across multiple ISIC industries rather than corresponding neatly to a single industrial classification, and the indicator derivation approaches developed for tourism can be adapted effectively for ocean economy structural analysis.

3.1 Ocean Economy Structure Framework

¶1 The structure of the ocean economy describes how economic activity is distributed across different industries, products, and institutional sectors. A full structural analysis enables comparison of the ocean economy to the broader national economy, identification of dominant and emerging sectors, and assessment of concentration and diversification. Figure 2.5.1 illustrates the end-to-end data pipeline that produces these structural indicators, from raw statistical inputs through harmonisation and the supply-use table to the indicators reported in budget and MEA applications.

DRAFT

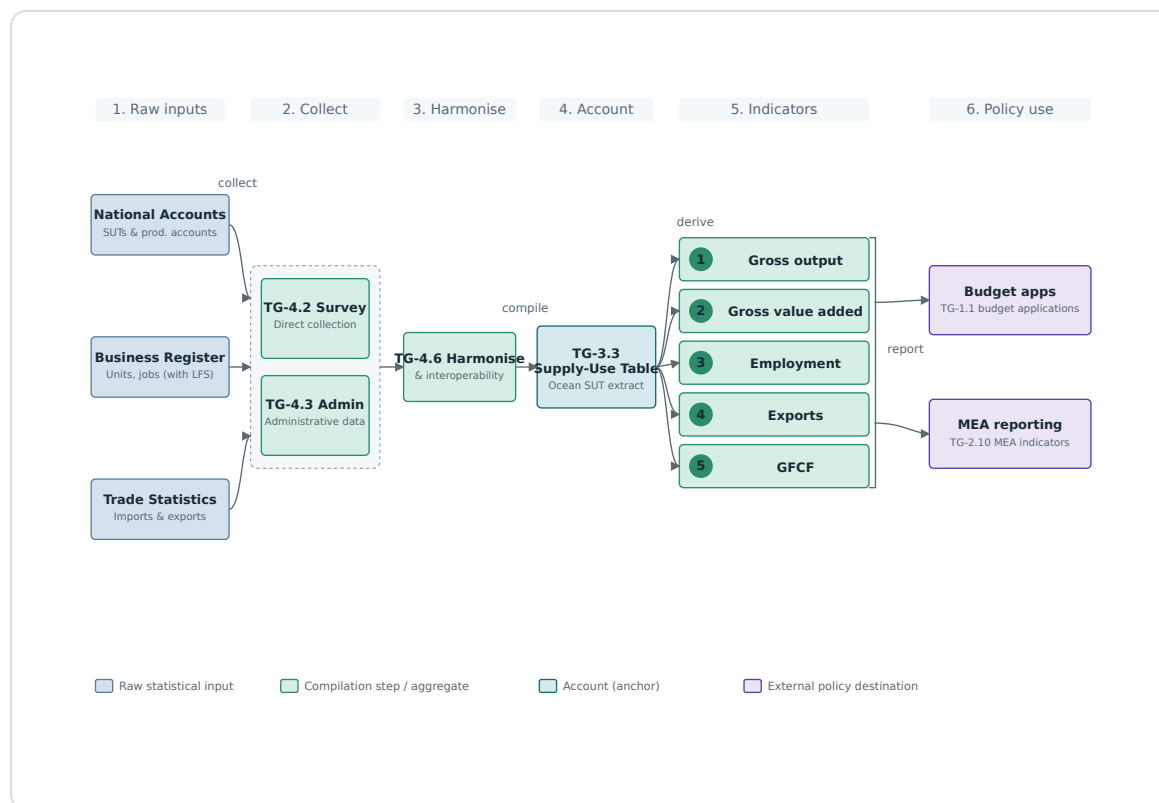


Figure 2.5.1 National statistical inputs flow through collection and harmonisation into a supply-use table that yields ocean economy indicators. Five first-order aggregates (output, GVA, employment, exports, GFCF) feed budget and MEA uses; second-order indicators sit downstream.

Source: TG-2.5 draft §3.1 (Supply-Use Table to indicator derivation trace) and §3.7 (compilation procedure / data pipeline); SNA 2025 Ch.15 (supply and use tables) and Ch.7 (production account); ISIC Rev.4 (UN 2008) for ocean industry classification.

Adapted from: SF-MST (UNWTO 2024) tourism measurement framework -- the draft's primary methodological analogue; OECD *The Ocean Economy in 2030* (2016).

Related terminology

¶1 *Ocean economy, marine economy, blue economy and sustainable ocean economy* are not interchangeable, and the distinctions between them are set out in **TG-1.0 Ocean Accounting and the Blue/Ocean Economy** Section 3.2, together with the rule that a published account must disclose which term it uses. The indicators in this Circular measure the **ocean economy** as scoped in **TG-3.3**. They support blue economy reporting but do not by themselves constitute a blue economy account – see TG-1.0 Section 3.3 for what an account can and cannot certify.

Analytical dimensions

¶1 Structural analysis of the ocean economy operates across four key dimensions⁴:

1. ¶2

Industry composition – the distribution of ocean economic activity across industries classified according to ISIC, revealing which types of production dominate the ocean economy (e.g., fishing, shipping, offshore energy)

2. ¶3

Product composition – the distribution of ocean-characteristic products according to CPC, revealing what goods and services the ocean economy produces

3. ¶4

Institutional sector composition – the distribution of ocean economic activity by institutional sector (corporations, government, households, non-profit institutions), revealing ownership and control patterns

4. ¶5

Spatial composition – the distribution of ocean economic activity across regions or coastal zones, revealing geographic concentration and regional dependencies. Spatial analysis connects to the treatment of coastal tourism in **TG-3.3** Section 3.4 and may inform future guidance on regional ocean accounts compilation⁵.

Geographic boundaries

¶1 ⓘ **Geographic Boundary Decisions**

¶2 The geographic definition of the ocean economy requires both a seaward boundary and an inland boundary, and both are settled in the account rather than in the indicators derived from it. The seaward boundary is normally the 200-nautical-mile Exclusive Economic Zone established under the United Nations Convention on the Law of the Sea (UNCLOS 1982). The inland boundary is a country-specific decision, set out with its documentation and disclosure requirements in **TG-3.3** Section 3.2.

¶3 For the indicators below, two consequences follow. A share computed on one country's boundary is not comparable with the same share computed on another's unless both disclose the boundary they applied. A boundary that moves between reference periods makes the trend in an indicator uninterpretable, whether or not the level is correct in each period⁶.

Relationship to thematic and extended accounts

¶1 Structural indicators are derived from the ocean economy thematic and extended accounts described in **TG-3.3 Economic Activity Relevant to the Ocean**. For the thematic and extended accounts framework (SNA 2025 Chapter 38), see **TG-0.2 Standards and Frameworks**. The ocean economy accounts described in this Circular are thematic accounts in the SNA 2025 sense: they disaggregate and rearrange items within the integrated framework of national accounts. The supply and use tables (SUTs) compiled for the ocean economy provide the 'data foundation' for structural analysis⁷. From balanced SUTs, the following can be derived:

- ¶2 Output by industry and product
- ¶3 Gross value added by industry
- ¶4 Employment by industry
- ¶5 Imports and exports of ocean-characteristic products
- ¶6 Gross fixed capital formation by industry

¶7 These aggregates form the basis for the indicators presented in subsequent sections.

Construction methods

¶1 Ocean economy accounts can be constructed using two approaches, which differ in data requirements and analytical scope⁶:

¶2 **Type 1 (thematic approach)** selects value-added data for designated ocean industries directly from existing national accounts production data. Each ocean industry's GVA is identified from the national production account and reported separately. This approach is lighter-weight, appropriate where fully balanced supply and use tables are not available, and lends itself to regional disaggregation more readily than the supply-use approach. Price adjustment uses a broad producer price index at the industry level. The core four indicators – gross output, GVA, employment, and GFCF – can be compiled from this approach.

¶3 **Type 2 (supply-use framework)** fully integrates ocean accounts within national input-output tables, measuring all inter-industry relationships at both product and industry level. This enables estimation of indirect and induced economic effects, reveals linkages between ocean industries and the rest of the economy, and requires product-level price deflators for volume measurement. This is the approach elaborated in §3.7 of this Circular⁸.

¶4 Compilers should select the approach matched to their data infrastructure. Type 1 is a valid and publishable starting point; migration to Type 2 is recommended as the end-state when fully bal-

anced SUTs are available.

¶5 **Note on production versus expenditure approaches:** Ocean accounts are built on the **production (value-added) approach** to GDP measurement. Whilst many countries publish their headline GDP figure using the expenditure approach (consumption + investment + government expenditure + net exports), the expenditure approach yields aggregate final demand totals and does not identify industry-level contributions. Both approaches yield the same GDP total under SNA 2025, but only the production approach enables identification of ocean economy industry composition. Compilers working within statistical systems that foreground expenditure-side figures should ensure that production-account data are accessed for ocean industry disaggregation.

SUT-to-indicator derivation trace

¶1 The derivation of structural indicators follows a specific path from the cells of the ocean economy SUTs compiled under **TG-3.3** Section 3.4 (Table 1) to the indicators presented in this Circular. Compilers should trace each indicator to its source aggregate to ensure consistency between accounts and indicators:

- ¶2 **GVA share by industry** – the GVA row in the Use Table provides gross value added for each ocean industry column (e.g., Marine Fishing, Aquaculture, Shipping, Ports, Tourism). Each cell is the numerator for the sector GVA share indicator in Section 3.2.
- ¶3 **Employment share by industry** – the labour inputs row (hours worked or persons employed) at the bottom of the Use Table provides the numerator for the employment share indicator.
- ¶4 **Export share** – the Exports column in the Use Table, summed across ocean-characteristic product rows (fish products, transport services, tourism services), provides the ocean economy exports aggregate used in Section 3.5.
- ¶5 **Investment indicators** – the GFCF column in the Use Table records capital formation by product type; the GFCF row by industry provides the industry-level investment data for investment rate calculations.
- ¶6 **Productivity** – labour productivity for each ocean industry is computed by dividing the GVA cell for that industry by the corresponding labour inputs cell.

¶7 This explicit mapping ensures that every indicator in this Circular can be traced back to a specific cell or aggregate in the ocean economy SUTs, providing a clear audit trail from accounts to indicators to policy applications.

3.2 Sector Composition Indicators

¶1 Sector composition indicators describe the relative importance of different industries within the ocean economy, enabling identification of dominant sectors, comparison with national industry structure, and tracking of structural change over time.

Classification framework

¶1 Ocean economy industries are classified using the International Standard Industrial Classification (ISIC)⁹. Following the categorisation in **TG-3.3** Section 3.3, ocean industries are grouped as:

¶2 **Core ocean-dependent industries** (wholly ocean-related). Core ocean-dependent industries are identified at the division or class level depending on whether the entire division is ocean-related or only specific classes within a broader division:

- ¶3 ISIC Division 03: Fishing and aquaculture
 - ¶4 Class 0311: Marine fishing
 - ¶5 Class 0321: Marine aquaculture
- ¶6 ISIC Division 50: Water transport
 - ¶7 Class 5011: Sea and coastal passenger water transport

- ¶8 Class 5012: Sea and coastal freight water transport
- ¶9 ISIC Division 06: Extraction of crude petroleum and natural gas (offshore portion)
- ¶10 ISIC Class 3510: Electric power generation, transmission and distribution (offshore wind, tidal, wave portion)

¶11 **Ocean-related industries** (partially ocean-related, requiring estimation of ocean share):

- ¶12 ISIC Class 1020: Processing and preserving of fish, crustaceans and molluscs
- ¶13 ISIC Class 3011: Building of ships and floating structures
- ¶14 ISIC Class 3012: Building of pleasure and sporting boats
- ¶15 ISIC Class 5222: Service activities incidental to water transportation
- ¶16 ISIC Class 5224: Cargo handling (port cargo handling share)
- ¶17 ISIC Class 5510: Short-term accommodation activities (coastal tourism share)
- ¶18 ISIC Class 7210: Research and experimental development (marine research share)
- ¶19 ISIC Class 8423: Public order and safety activities (coast guard, maritime enforcement share)
- ¶20 ISIC Class 9319: Other sports activities (marine sports and recreation share)

¶21 This listing is illustrative and should be verified against the fuller classification in **TG-3.3** Section 3.3, which provides the authoritative industry concordance for ocean economy accounts. Compilers should adapt the industry scope to their national circumstances and document the specific ISIC classes included. For offshore oil and gas extraction and offshore renewable energy, additional classification detail is provided in **TG-3.10 Offshore Energy**.

Scope decisions and international practice

¶1 There is no single agreed scope for the ocean economy, and national programmes legitimately differ. The 35-country review of ocean account definitions, the Portugal / United States / Norway comparison and the EU and OECD measurement programmes are in **TG-1.0 Ocean Accounting and the Blue/Ocean Economy** Sections 3.1 and 3.6; the industry scope a compiler actually applies is **TG-3.3** Section 3.4. The consequence for the indicators below is that a share computed on one country's scope is not comparable with the same share computed on another's unless both disclose the scope, the tier and the ocean-ratio estimation level.

Key composition indicators

¶1 The following indicators characterise sector composition¹⁰:

¶2 Output share by industry

$$\text{Output share}_i = \frac{\text{Output}_i}{\sum_j \text{Output}_j} \times 100$$

¶3 where i denotes an individual ocean industry and j indexes all ocean industries.

¶4 GVA share by industry

$$\text{GVA share}_i = \frac{\text{GVA}_i}{\sum_j \text{GVA}_j} \times 100$$

¶5 This indicator reveals the relative contribution of each industry to total ocean economy value added. In the Ocean Accounts Framework (TG-0.1), the GDP contribution, industry output, and supply-use relationships measured through these structural indicators correspond to Edge E3 (mone-

tary flows between assets and economic sectors), capturing the bidirectional monetary flows that characterise the ocean economy's productive structure.

¶6 **Employment share by industry**

$$\text{Employment share}_i = \frac{\text{Employment}_i}{\sum_j \text{Employment}_j} \times 100$$

¶7 Employment may be measured as number of persons employed, number of jobs, hours worked, or full-time equivalent (FTE) positions¹¹. For headline reporting, persons employed is recommended as the default measure, with FTE reported as a supplementary indicator where seasonal or part-time employment is significant.

¶8 **Herfindahl-Hirschman Index (HHI) for concentration**

$$\text{HHI} = \sum_i \left(\frac{\text{GVA}_i}{\sum_j \text{GVA}_j} \times 100 \right)^2$$

¶9 The HHI ranges from near zero (highly diversified) to 10,000 (single industry). In antitrust analysis, an HHI above 2,500 is conventionally treated as indicating high concentration. For ocean economy sectoral analysis, however, compilers should interpret HHI values with caution. Small island developing States (SIDS) and countries with narrow resource endowments may exhibit structurally higher concentration in their ocean economies—dominated, for example, by fisheries and tourism—without this necessarily indicating a policy concern in the same way that high market concentration does. Compilers should present the HHI alongside the detailed composition data in Table 3.1 so that users can assess whether concentration reflects structural characteristics of the economy or an imbalance that warrants policy attention.

Comparative analysis

¶11 Recommended comparisons include:

1. ¶12

Comparison to national economy – comparing ocean industry shares to their shares in the national economy reveals specialisation patterns

2. ¶13

Comparison over time – tracking composition changes reveals structural transformation (e.g., growth of offshore energy relative to traditional fishing)

3. ¶14

International comparison – comparing ocean economy structure across countries reveals different endowments and development patterns

¶15 Table 3.1 presents sector composition indicators for a hypothetical medium-income coastal state ("Country A") with a total GDP of approximately USD 50 billion, total employment of 10 million persons, and an ocean economy representing 3.5 per cent of national GVA. All monetary values are expressed in millions of USD.

¶16 **Table 3.1: Ocean economy sector composition (Country A, illustrative)**

Industry (ISIC)	Output (million USD)	GVA (million USD)	Employment (persons)	Output share (%)	GVA share (%)	Employment share (%)
Coastal and marine tourism (partial 5510, 5610, 9319)	933	560	153,000	27.2	32.0	51.0
Offshore oil and gas (06)	933	420	24,000	27.1	24.0	8.0
Maritime transport and ports (501, 5222, 5224)	630	315	36,000	18.3	18.0	12.0
Marine living resources (0311, 0321, 1020)	318	175	54,000	9.3	10.0	18.0
Shipbuilding and repair (3011, 3012)	308	123	18,000	9.0	7.0	6.0
Marine renewable energy (3510 partial)	140	70	6,000	4.1	4.0	2.0
Other ocean industries (7210, 8423, etc.)	174	87	9,000	5.0	5.0	3.0
Total ocean economy	3,436	1,750	300,000	100.0	100.0	100.0

¶7 The HHI computed from the GVA shares in Table 3.1 is approximately 2,114 ($= 32.0^2 + 24.0^2 + 18.0^2 + 10.0^2 + 7.0^2 + 4.0^2 + 5.0^2$), indicating moderate concentration. Two sectors—coastal and marine tourism and offshore energy—together account for 56 per cent of ocean GVA, a pattern common in medium-income coastal states with established hydrocarbon production.

¶8 To make comparative analysis concrete, Table 3.1a presents a recommended format for comparing ocean economy structure against the national economy. This comparative presentation, adapted from the SF-MST approach to characterising tourism industries (SF-MST Table 3.3), enables identification of sectors in which the ocean economy is relatively more or less intensive than the national economy as a whole.

¶9 **Table 3.1a: Ocean economy versus national economy structure (Country A, illustrative)**

Indicator	Ocean economy	National economy	Ocean share of national (%)
Total output (million USD)	3,436	100,000	3.4
GVA (million USD)	1,750	50,000	3.5
Employment (persons)	300,000	10,000,000	3.0
GVA per person employed (USD)	5,833	5,000	116.7
Average compensation per employee (USD)	3,208	3,000	106.9
GFCF (million USD)	380	11,000	3.5
Exports (million USD)	620	12,000	5.2

¶10 The data in Table 3.1a reveal that whilst the ocean economy accounts for 3.5 per cent of national GVA, it accounts for only 3.0 per cent of employment, implying slightly above-average labour productivity. The ocean economy's share of exports (5.2 per cent) exceeds its share of national GVA, indicating an outward orientation driven by fish product exports and maritime transport services.

Budget-ready summary

¶11 Table 3.1b maps the indicators derived from Tables 3.1 and 3.1a directly to the four-row budget presentation structure specified in **TG-1.1** Section 3.3 (Table 1). This table provides the format in

which ocean economy indicators should be presented in national budget submissions to demonstrate the sector's contribution to the national economy.

¶2 **Table 3.1b: Ocean economy contribution – budget presentation format (Country A, illustrative)**

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

3.3 Growth and Productivity Indicators

¶1 Growth and productivity indicators measure the dynamic performance of the ocean economy, revealing whether it is expanding or contracting, whether growth is generating productivity improvements, and how ocean economy performance compares to the broader economy.

Growth indicators

¶1 **Nominal growth rate**

$$\text{Growth rate}_t = \frac{X_t - X_{t-1}}{X_{t-1}} \times 100$$

¶2 where X is the variable of interest (output, GVA, employment) and t is the reference period.

¶3 **Real growth rate** – adjusts for price changes using appropriate deflators¹²:

$$\text{Real growth rate}_t = \frac{X_t/P_t - X_{t-1}/P_{t-1}}{X_{t-1}/P_{t-1}} \times 100$$

¶4 where P is the relevant price index. The choice of deflator is important for ocean economy aggregates because price movements in ocean industries can diverge substantially from economy-wide trends. Offshore energy output, for example, is strongly influenced by international oil and gas price indices, whilst maritime transport output responds to freight rate indices such as the Baltic Exchange indices. Compilers should use industry-specific deflators where available rather than applying the aggregate GDP deflator to all ocean industries. Where sector-specific deflators are unavailable, compilers should document the deflator used and assess the potential bias introduced. Methodological guidance on deflation and volume measurement is provided in SNA 2025 Chapter 18, and further context on the statistical standards governing price and volume measures is available in **TG-0.2 Overview of Relevant Statistical Standards**.

¶5 **Compound annual growth rate (CAGR)** – measures average annual growth over multiple periods:

$$\text{CAGR} = \left(\frac{X_T}{X_0} \right)^{1/T} - 1$$

¶6 where X_0 is the value at the beginning of the period, X_T is the value at the end, and T is the number of years between them.

Productivity indicators

¶1 Productivity measures the efficiency with which inputs are transformed into outputs. Two measures are particularly relevant for ocean economy analysis¹³:

¶2 Labour productivity

$$\text{Labour productivity} = \frac{\text{GVA}}{\text{Employment}}$$

¶3 This can be expressed per person employed, per job, or per hour worked. Labour productivity in ocean industries can be compared to national averages to assess relative efficiency.

¶4 Capital productivity (where capital stock data are available)

$$\text{Capital productivity} = \frac{\text{GVA}}{\text{Capital stock}}$$

¶5 Capital stock data for ocean industries are often limited, particularly for industries such as off-shore energy and maritime transport where assets are mobile and may be registered in multiple jurisdictions. Where direct capital stock data are unavailable, compilers may estimate capital stocks using the perpetual inventory method, applying asset-specific depreciation rates to historical investment series. The asset valuation methodology described in **TG-3.1 Asset Accounts** provides relevant guidance on produced capital valuation that can be adapted for ocean industries, particularly for vessels, port infrastructure, and offshore installations¹⁴.

¶6 **Multi-factor productivity growth** requires more sophisticated analysis combining labour, capital, and intermediate inputs, typically using growth accounting or index number methods¹⁵.

Ocean economy contribution to GDP growth

¶1 A particularly policy-relevant indicator is the contribution of the ocean economy to overall GDP growth¹⁶:

¶2

$$\text{Contribution to GDP growth} = \frac{\Delta \text{Ocean GVA}}{\text{GDP}_{t-1}} \times 100$$

¶3 This measures the percentage point contribution of ocean economy growth to national GDP growth. This indicator is directly relevant for the budget justifications addressed in **TG-1.1 OA and National Budget Processes** and for demonstrating the economic importance of ocean management investment.

3.4 Net Ocean GVA

¶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. The SNA 2025 treats depletion of non-produced natural resources as a cost of production (SNA 2025 Chapter 13, para 13.26; see also the net value added formula in Chapter 15, para 15.137), and **TG-1.1** Section 3.1 identifies net domestic product (NDP) as the conceptually preferred measure of economic growth¹⁷. For the ocean economy, this has particular significance because fisheries, offshore minerals, and other extractive ocean industries draw down natural capital stocks.

¶2 **Net ocean GVA** is defined as:

¶3

Net ocean GVA = Gross ocean GVA – Depletion of marine natural resources

¶4 Depletion of marine natural resources includes:

- ¶5 **Depletion of fish stocks** – the decline in the economic value of fish stock assets due to harvesting in excess of natural regeneration. Estimation methods are described in **TG-3.1 Asset Accounts**, drawing on stock assessment data from **TG-6.7 Fisheries Accounting: Integrating Stock Assessment**.
- ¶6 **Depletion of seabed minerals** – the decline in the economic value of offshore mineral and hydrocarbon reserves due to extraction. Valuation follows the SNA 2025 treatment of subsoil assets (Chapter 15, rows 22–23 of the Use Table).

¶7 Where depletion estimates are available, compilers should present both gross and net measures of ocean GVA side by side. The difference between gross and net ocean GVA reveals the extent to which the ocean economy's recorded economic contribution depends on the drawdown of natural capital. A large and growing gap between gross and net ocean GVA signals unsustainable resource use patterns that should inform policy deliberations under medium-term expenditure frameworks (**TG-1.1** Section 3.4). In the Country A illustration (Table 3.1), if fish stock depletion is estimated at USD 35 million and offshore mineral depletion at USD 60 million per year, net ocean GVA would be USD 1,655 million—approximately 5.4 per cent below the gross figure of USD 1,750 million.

3.5 Employment Structure

¶1 Employment structure indicators characterise the labour market dimensions of the ocean economy, informing policies on education, training, migration, and social protection.

Employment levels and shares

¶1 **Ocean economy employment share**

$$\text{Employment share} = \frac{\text{Ocean employment}}{\text{Total national employment}} \times 100$$

¶2 **Industry-specific employment** – employment in each ocean industry, enabling analysis of which sectors are most labour-intensive¹⁸.

Employment characteristics

¶1 Beyond aggregate employment, structural analysis should capture employment quality and composition¹⁹:

¶2 **Status in employment**

- ¶3 Employees (wage and salary workers)
- ¶4 Employers
- ¶5 Own-account workers
- ¶6 Contributing family workers

¶7 **Working time**

- ¶8 Full-time versus part-time employment
- ¶9 Average hours worked
- ¶10 Seasonal patterns in employment

¶11 **Demographic characteristics**

- ¶12 Gender composition (share of women in ocean employment)
- ¶13 Age structure
- ¶14 Educational attainment
- ¶15 Nationality (share of migrant workers)

¶16 **Decent work indicators** following the ILO Decent Work Measurement Framework²⁰:

- ¶17 Share of formal versus informal employment
- ¶18 Wage levels relative to national average
- ¶19 Working conditions indicators
- ¶20 Social protection coverage

¶21 The distinction between formal and informal employment is particularly relevant for small-scale fisheries, where employment is often characterised by own-account work, seasonal or part-time engagement, and limited coverage by labour regulations or social protection schemes. Measuring employment in small-scale fisheries presents methodological challenges: workers may not appear in business registers, labour force surveys may undercount seasonal or part-time fishing activity, and the boundary between subsistence fishing and commercial fishing can be difficult to establish. Compilers should consider supplementing standard data sources with fisheries census data, community-based surveys, and vessel registry information. Employment patterns in aquaculture, including the prevalence of informal and seasonal work in coastal communities, are addressed in **TG-3.9 Aquaculture**. The connection between employment data and stock management is discussed in **TG-6.7 Fisheries Accounting: Integrating Stock Assessment**.

¶22 Table 3.2 presents employment structure indicators for Country A, populated with synthetic data reflecting typical patterns observed in medium-income coastal states.

¶23 **Table 3.2: Ocean economy employment structure (Country A, illustrative)**

Indicator	Marine fishing	Aquaculture	Maritime trans-port	Offshore energy	Shipbuilding	Coastal tourism	Total
Persons employed	32,000	22,000	36,000	24,000	18,000	153,000	3
FTE employment	24,000	18,000	35,000	24,000	17,500	120,000	2
Share female (%)	15	35	12	15	8	55	3
Share youth < 25 (%)	22	28	15	10	18	35	2
Share informal (%)	60	40	5	2	5	30	2
Avg. wage (USD/month)	280	320	750	2,800	680	350	4
Productivity index (economy = 100)	55	55	180	350	120	65	1

¶24 The Total ocean column covers all seven industries in Table 3.1. Marine renewable energy (6,000 persons) and other ocean industries (9,000 persons) are not shown as columns, so the six columns sum to 285,000 persons and 238,500 FTE; the remaining 15,000 persons and 11,500 FTE belong to those two industries. Marine fishing and aquaculture together make up marine living resources in Table 3.1 (54,000 persons).

¶25 Marine fishing exhibits the highest informality rate (60 per cent) and the lowest female participation (15 per cent), consistent with the artisanal and small-scale character of much of the sector. Coastal tourism is the largest employer by a substantial margin (153,000 persons, or 51 per cent of ocean employment), but it has the highest rate of part-time and seasonal work, as reflected in the gap between persons employed and FTE employment. Offshore energy employs relatively few workers (24,000 persons) but generates the highest wages and highest productivity index (350), reflecting the capital-intensive nature of offshore oil, gas, and wind operations. These patterns

inform workforce development policies, gender mainstreaming strategies, and social protection design for ocean-dependent communities.

Spatial distribution of employment

¶1 Spatial analysis of ocean employment reveals regional concentration, coastal community dependence, and commuting patterns between coastal and inland areas. This spatial dimension connects to livelihood dependency analysis in **TG-2.3 Livelihood Dependencies**.

3.6 Trade and Investment Indicators

¶1 Trade and investment indicators reveal the ocean economy's external orientation and its capacity for growth through capital accumulation.

Trade indicators

¶1 Ocean economy exports

$$\text{Export share} = \frac{\text{Exports of ocean products}}{\text{Total national exports}} \times 100$$

¶2 Ocean exports include:

- ¶3 Fish and fishery products
- ¶4 Maritime transport services
- ¶5 Offshore oil and gas (where applicable)
- ¶6 Cruise and marine tourism receipts
- ¶7 Ship repair services

¶8 **Ocean economy imports** – imports of ocean-characteristic products, including:

- ¶9 Fishing vessels and equipment
- ¶10 Maritime transport services (freight payments)
- ¶11 Offshore drilling equipment
- ¶12 Imported fish for processing

¶13 Trade balance for ocean economy

$$\text{Ocean trade balance} = \text{Ocean exports} - \text{Ocean imports}$$

¶14 **Revealed comparative advantage** – indicates whether a country specialises in ocean products relative to its overall trade pattern²¹:

$$\text{RCA}_i = \frac{(X_i/X)}{(X_i^{\text{world}}/X^{\text{world}})}$$

¶15 where X_i is exports of ocean product i , X is total exports, X_i^{world} is world exports of ocean product i , and X^{world} is total world exports. An $\text{RCA} > 1$ indicates comparative advantage.

¶16 Maritime transport services trade requires careful treatment due to the distinction between resident and non-resident operators. The spatial treatment of economic activities within the Exclusive Economic Zone is addressed in **TG-3.3** Section 3.1. The Balance of Payments Manual (BPM6; BPM7, forthcoming) provides detailed guidance on recording maritime transport services in the current account, including the allocation of freight charges between importing and exporting economies and the treatment of services provided by non-resident carriers²². Compilers should

ensure that trade in maritime transport services is recorded consistently between the ocean economy accounts and the balance of payments.

Investment indicators

¶1 **Gross fixed capital formation (GFCF) in ocean industries**

¶2 Ocean economy investment includes:

- ¶3 Vessels (fishing boats, cargo ships, cruise ships)
- ¶4 Port infrastructure (harbours, terminals, cargo handling equipment)
- ¶5 Offshore platforms and installations
- ¶6 Aquaculture facilities
- ¶7 Coastal tourism infrastructure

¶8 **Investment rate**

$$\text{Investment rate} = \frac{\text{Ocean GFCF}}{\text{Ocean GVA}} \times 100$$

¶9 **Investment share**

$$\text{Investment share} = \frac{\text{Ocean GFCF}}{\text{Total national GFCF}} \times 100$$

¶10 This reveals the ocean economy's share of national capital formation.

¶11 **Foreign direct investment (FDI) in ocean sectors** – where data permit, the stock and flow of FDI in ocean industries provides insight into external capital participation. This may be particularly significant in offshore energy, maritime transport, and port operations²³. FDI data by detailed industry are often limited and may be subject to confidentiality constraints where few enterprises operate in a given industry. Where direct FDI data are unavailable, compilers may use alternative approaches such as ownership information from business registers, investment project tracking databases, or qualitative assessments based on known foreign ownership in key ocean industries. Detailed treatment of investment analysis for the ocean economy is provided in **TG-2.6**

Ocean Investment.

Sustainable ocean finance

¶1 Beyond conventional GFCF, the investment dimension of the ocean economy increasingly includes **sustainable ocean finance** instruments such as blue bonds, blue loans, and blue equity investments. These instruments channel capital towards ocean-related activities that meet defined environmental sustainability criteria. Whilst sustainable finance flows are not recorded as GFCF in the national accounts (they represent financial transactions rather than acquisition of produced assets), their scale and growth constitute an important structural characteristic of the ocean economy's financing landscape. The methodology for measuring sustainable ocean finance, including classification criteria, data sources, and indicator definitions, is addressed in **TG-2.6 Ocean Investment** Section 3.4.

¶2 Table 3.3 presents trade and investment indicators for Country A.

¶3 **Table 3.3: Ocean economy trade and investment (Country A, illustrative)**

Indicator	Value (million USD)	Share of national total (%)
Ocean economy exports	620	5.2
- Fish and fishery products	215	1.8

Indicator	Value (million USD)	Share of national total (%)
- Maritime transport services	240	2.0
- Other ocean products	165	1.4
Ocean economy imports	480	3.8
Ocean trade balance	140	–
Ocean GFCF	380	3.5
- Vessels	95	–
- Port infrastructure	110	–
- Offshore installations	125	–
- Other ocean assets	50	–
FDI stock in ocean industries	1,200	4.8

Government expenditure on ocean-related functions

¶1 Government expenditure on ocean-related activities can be identified using the Classification of the Functions of Government (COFOG)²⁴. Table 3.4 maps specific COFOG classes to ocean-related government functions, adapted from the SF-MST approach to identifying tourism-related government functions (SF-MST Table 3.9)²⁵.

¶2 **Table 3.4: COFOG classes relevant to ocean economy functions**

COFOG Division	COFOG Class	Ocean-related function
01 General public services	01.3 General services	Maritime administration, hydrographic services
03 Public order and safety	03.1 Police services	Coast guard, maritime enforcement
04 Economic affairs	04.2 Agriculture, forestry, fishing	Fisheries management, aquaculture support
04 Economic affairs	04.5 Transport	Maritime transport infrastructure, port development
04 Economic affairs	04.7 Other industries	Marine biotechnology, ocean industry support
05 Environmental protection	05.1 Waste management	Marine pollution remediation
05 Environmental protection	05.2 Wastewater management	Coastal wastewater treatment
05 Environmental protection	05.4 Protection of biodiversity	Marine protected area management
06 Housing and community	06.3 Water supply	Desalination
07 Health	07.4 Public health services	Marine food safety
08 Recreation, culture	08.1 Recreational and sporting	Coastal recreation infrastructure
09 Education	09.4 Tertiary education	Maritime education and training
10 Social protection	10.5 Unemployment	Fisheries worker adjustment programmes

¶3 This mapping supports analysis of public investment in ocean management addressed in **TG-1.1 OA and National Budget Processes**.

3.7 Compilation Procedure

¶1 The procedure below is adapted from the SNA 2025 treatment of supply and use tables (Chapter 15, paras 15.9, 15.130–15.139) and draws on the analogous approach developed for tourism in the SF-MST (paras 2.30–2.31, 3.27–3.28)²⁶.

Step-by-step compilation

¶1 **Steps 1–5 are TG-3.3's.** Identifying ocean industries through the ISIC concordance, extracting the sub-matrices from the balanced national SUTs, determining the ocean ratio for each partially

ocean-related industry, computing Ocean Economy Direct GVA and adjusting for taxes less subsidies on products to reach Ocean Economy Direct GDP are all specified in **TG-3.3 Economic Activity Relevant to the Ocean** Sections 3.4 and 3.5. They are not restated here.

¶12 What a compiler needs to check before deriving the indicators below is that the extract carries: GVA and employment **by industry** rather than as an ocean-economy total, the **ocean ratio and its estimation level** recorded per industry, and a consistent **employment measure** across numerator and denominator. Composition, productivity and structure indicators all require the disaggregation; the ratios cannot be recovered from a single total.

¶13 **Step 6: Derive indicators from the ocean economy SUT extract.** Using the ocean economy sub-matrices and the ocean economy ratios, compute the full set of structural indicators described in Sections 3.2 through 3.6 of this Circular: sector composition indicators (GVA shares, employment shares, HHI), growth and productivity indicators, net GVA, employment structure, and trade and investment indicators.

Data pipeline

¶1 Raw data are collected through surveys (**TG-4.2**) and administrative records (**TG-4.3**), harmonised (**TG-4.6**), and compiled into ocean economy thematic accounts (**TG-3.3**). The indicator formulas in this Circular are then applied to produce structural indicators, which are formatted for policy application in national budget processes (**TG-1.1**) and international reporting (**TG-2.10**).

3.8 Compilation Considerations

Data sources

¶1 Key data sources include²⁷:

- ¶2 National accounts (supply and use tables, production accounts)
- ¶3 Business surveys and censuses
- ¶4 Labour force surveys
- ¶5 Trade statistics
- ¶6 Administrative records (vessel registries, port authorities, fishing licences)

¶7 Detailed guidance on the utilisation of these data sources is provided in **TG-4.2 Survey Methods for Ocean Economic Activity**, **TG-4.3 Administrative Data Sources**, and **TG-4.6 Data Harmonisation and Interoperability**.

Informal economy and indicator reliability

¶1 Structural indicators may understate the full extent of the ocean economy where informal economic activities are significant. Small-scale fisheries, artisanal aquaculture, informal coastal tourism services, and subsistence marine harvesting are often inadequately captured by standard business surveys and national accounts. In countries where informal activities constitute a substantial share of ocean-related production and employment, the indicators derived from formal data sources may present an incomplete picture of the ocean economy's true size and structure. Compilers should document the estimated coverage of formal data sources relative to the full ocean economy, identify sectors where informal activity is likely to be most significant, and consider the supplementary estimation methods described in **TG-4.2** and **TG-4.3** for improving coverage of informal activities. Reporting these coverage limitations alongside the indicators lets users interpret aggregate statistics with appropriate caution.

Quality indicators

¶1 Compilers should document:

- ¶2 Coverage (which industries and products are included)

- ¶3 Methods for estimating ocean-related shares of mixed industries
- ¶4 Frequency of data collection and time lags
- ¶5 Accuracy estimates and confidence intervals where available

¶6 Quality assurance guidance is provided in **TG-0.7 Quality Assurance Principles**.

¶7 **Publication scope norm.** Compilers should publish only what their supply and use tables can support. The starting set is the core four indicators – gross output, GVA, employment, and GFCF – compiled directly from the SUTs; trade in ocean-characteristic products is added only where it can be balanced against the SUTs. Extension to additional indicators is appropriate only after supplementary sources have been properly reconciled with national accounts data. Where partials are used, the underlying data sources and allocation rules should be published alongside indicator results⁸.

¶8 **Metadata requirements.** Ocean accounts metadata should document at minimum: sector and industry coverage, the economic concepts applied (including whether a Type 1 or Type 2 approach was used), time period, geographic definition and inland boundary decisions, industrial classification system, data collection method per industry (survey, administrative data, or expert judgement), and any confidentiality suppressions applied. Because ocean account scope and geographic boundary definitions legitimately differ across countries, metadata is the primary mechanism enabling valid cross-country comparisons⁶.

Comparability considerations

¶1 For time series analysis and international comparison:

- ¶2 Use consistent industry and product classifications
- ¶3 Apply consistent valuation principles (basic prices versus purchasers' prices)
- ¶4 Document changes in methodology that affect comparability
- ¶5 Use appropriate exchange rates for international comparison

¶6 The standing international comparators – the European Commission's annual *EU Blue Economy Report* and the OECD's ocean economy measurement work – are described in **TG-1.0** Section 3.6, and the reader-side checklist for interrogating a published figure is TG-1.0 Section 3.7.

4. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

5. References

1. ¶1 United Nations et al. (2025). *System of National Accounts 2025*. New York: United Nations. ST/ESA/STAT/SER.F/2/Rev.6. Chapters 7 (Production account), 15 (Supply and use tables), and 18 (Measuring prices, volumes and productivity).
2. ¶2 World Tourism Organization (2024). *Statistical Framework for Measuring the Sustainability of Tourism (SF-MST)*. Final Draft, February 2024. Chapter 3 on Measuring the economic dimension. See particularly Section 3.3 on "Measuring the economic structure and performance of tourism industries."
3. ¶3 United Nations (2021). *System of Environmental-Economic Accounting – Ecosystem Accounting*. Statistical Papers Series F No. 124. New York: United Nations. Chapter 13 on accounting for specific environmental themes, including the ocean economy thematic accounting component.
4. ¶4 This four-dimensional framework draws on the analytical approaches described in OECD (2016). *The Ocean Economy in 2030*. Paris: OECD Publishing.
5. ¶5 World Tourism Organization (2024). *SF-MST*, Section 2.5 on Measuring the sustainability of tourism at sub-national levels. The destination-level measurement approaches described in Section 3.7 are directly adaptable for coastal and marine economic zone analysis.
6. ¶6 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/>)

7. ¶7 United Nations et al. (2025). *System of National Accounts 2025*, Chapter 15 on Supply and use tables provides the methodological foundation for deriving structural indicators.
8. ¶8 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/>)
9. ¶9 United Nations (2008). *International Standard Industrial Classification of All Economic Activities (ISIC), Revision 4*. Statistical Papers Series M No. 4/Rev.4. New York: United Nations.
10. ¶10 These indicators follow standard practice in economic structure analysis. See Eurostat (2013). *European System of Accounts (ESA 2010)*. Luxembourg: Publications Office of the European Union.
11. ¶11 UNWTO and UNSD (2008). *International Recommendations for Tourism Statistics 2008*, Chapter 7 provides guidance on employment measures applicable to sector thematic accounts.
12. ¶12 United Nations et al. (2025). *System of National Accounts 2025*, Chapter 18 on Measuring prices, volumes and productivity provides guidance on deflation methods.
13. ¶13 OECD (2001). *Measuring Productivity: OECD Manual*. Paris: OECD Publishing. Provides comprehensive guidance on productivity measurement applicable to sectoral analysis.
14. ¶14 The perpetual inventory method is described in OECD (2009). *Measuring Capital: OECD Manual*. 2nd edition. Paris: OECD Publishing. For ocean-industry-specific asset valuation, see also **TG-3.1 Asset Accounts**.
15. ¶15 For multi-factor productivity analysis, see Jorgenson, D.W., F.M. Gollop, and B.M. Fraumeni (1987). *Productivity and U.S. Economic Growth*. Cambridge: Harvard University Press.
16. ¶16 This decomposition follows standard growth accounting practice. See SNA 2025 Chapter 18 for methodological details.
17. ¶17 United Nations et al. (2025). *System of National Accounts 2025*, Chapter 15, para 15.137: “Gross value added minus depreciation of fixed assets minus depletion of non-produced natural resources equals net value added.” See also **TG-1.1** Section 3.1 on the policy rationale for net measures.
18. ¶18 Industry-level employment data follow ISIC classification, consistent with the industry classification in **TG-3.3 Economic Activity Relevant to the Ocean**.
19. ¶19 ILO (2018). *Guidelines concerning statistics of international labour migration*. 20th International Conference of Labour Statisticians. Geneva: ILO.
20. ¶20 ILO (2013). *Decent Work Indicators: Guidelines for Producers and Users of Statistical and Legal Framework Indicators*. 2nd edition. Geneva: ILO.
21. ¶21 Balassa, B. (1965). “Trade Liberalisation and ‘Revealed’ Comparative Advantage.” *The Manchester School* 33(2): 99-123.
22. ¶22 IMF (2009). *Balance of Payments and International Investment Position Manual*. 6th edition (BPM6). Washington, D.C.: International Monetary Fund. Chapter 10 on goods and services, particularly Section C on transport services.
23. ¶23 UNCTAD (2022). *World Investment Report 2022*. Geneva: United Nations Conference on Trade and Development. Chapter on sustainable blue economy investment.
24. ¶24 United Nations (2000). *Classification of the Functions of Government (COFOG)*. In *Classifications of Expenditure According to Purpose*. Statistical Papers Series M No. 84. New York: United Nations.
25. ¶25 World Tourism Organization (2024). *SF-MST*, Table 3.9 on “Tourism related Functions of Government – COFOG classes.” The mapping in Table 3.4 adapts this approach for ocean economy functions.
26. ¶26 The compilation procedure adapts the SNA 2025 supply and use table compilation methodology (Chapter 15, paras 15.9, 15.130–15.139) and the tourism ratio approach from the SF-MST (paras 2.30–2.31, 3.27–3.28). For the ocean economy context, see also **TG-3.3** Section 3.4 on ocean economy SUT compilation.
27. ¶27 Data source guidance aligns with **TG-4.2 Survey Methods for Ocean Economic Activity**, **TG-4.3 Administrative Data Sources**, and **TG-4.6 Data Harmonisation and Interoperability** in the Ocean Accounts Technical Guidance series.