

Sub-National Ocean Accounts

Compiles ocean accounts at sub-national scales—provinces, municipalities.

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DRAFT

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After completing this Circular, readers will be able to compile ocean accounts at sub-national scales—provinces, municipalities, marine parks, coastal zones, and other administrative or ecological regions below the national level. The Circular serves as the centralised reference for sub-national applicability across all ocean account types, addressing the spatial delineation of national accounting areas, regionalisation of national supply-use tables, the compilation of ecosystem extent and condition accounts at local scales, and the design of information products for local decision-makers.

Section 3.4 extends the same disaggregation logic one step further, to enterprise-level attribution: expressing a single firm's dependence on, or contribution to, the totals for the area it operates in, which is what corporate reporting under TNFD, IFRS S1 and CSRD requires ([TG-1.11 OA and the Private Sector](#) Section 3.5).

Sub-national ocean accounts respond to a basic reality of ocean governance: most management decisions affecting marine and coastal resources are taken at the local or regional level. Marine

spatial plans, fisheries access arrangements, coastal development permits, pollution discharge licences, and protected area management plans are typically the responsibility of sub-national

authorities—provincial governments, municipal councils, port authorities, or marine park agencies.

These authorities require accounting information that is spatially relevant to their jurisdiction.

National aggregates obscure local variation and do not meet this need.

Key decision use cases enabled by sub-national ocean accounts include:

Provincial and municipal coastal planning: Sub-national governments responsible for coastal zones require integrated data on ecosystem extent, condition, economic activity, and pressures within their jurisdiction. A provincial governor managing a coastline with competing uses—tourism, fishing, aquaculture, port development—needs accounts that record how these activities interact with local ecosystems and what trade-offs are involved. Sub-national ecosystem extent and condition accounts provide the evidence base for zoning decisions and development control (see [TG-1.2 Marine Spatial Planning](#)).

Marine protected area management: Park managers require detailed accounts of ecosystem assets within their boundaries, including extent and condition changes, ecosystem service flows, and the economic activities of surrounding communities that depend on or affect the protected area. Sub-national accounts enable adaptive management by tracking whether conservation interventions are maintaining or improving ecosystem condition (see [TG-1.3 Marine Spatial Management](#)).

Local economic development planning: Municipal and regional authorities seeking to develop sustainable ocean economies require information on the structure and performance of ocean-related industries in their area, the natural capital base supporting those industries, and the distributional consequences of resource use for local populations (see [TG-1.10 National Planning](#)).

Integrated coastal zone management: Authorities responsible for managing the land-sea interface need accounts that capture upstream-downstream relationships between terrestrial catchments and marine receiving waters, linking land-use change, nutrient runoff, and coastal ecosystem condition at scales relevant to management intervention (see [TG-2.7 Pollution and Other Flows to Environment](#)).

This Circular addresses the delineation of sub-national spatial units (Section 3.1), methods for regionalising national supply-use tables (Section 3.2), a sub-national applicability matrix for all account types (Section 3.3), approaches to linking sub-national accounts to local planning processes (Section 3.5), and the design of dashboards and information products for local decision-makers (Section 3.6).

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2. Requirements

¶1 Essential prerequisites:

- ¶2 **TG-0.1 General Introduction to Ocean Accounts:** conceptual framework and the definition of the ocean accounting area
- ¶3 **TG-3.1 Asset Accounts:** methodology of physical and monetary asset accounts, including ecosystem extent and condition accounts
- ¶4 **TG-3.3 Economic Activity Relevant to the Ocean:** ocean economy thematic and extended accounting framework, including the ISIC-ocean economy concordance (Table 2)
- ¶5 **TG-3.8 Combined Presentations:** principles governing integration of multiple account types

¶6 Helpful background:

- ¶7 **TG-4.1 Remote Sensing and Geospatial Data:** satellite-based methods of measuring ecosystem extent at fine spatial resolution

¶8 ⓘ Framework Position

¶9 This Circular addresses the spatial disaggregation of all ocean account components to sub-national scales. Sub-national accounts do not introduce new accounting relationships. Rather, they apply the same eleven relationships (E1–E11) identified in the Ocean Accounts Framework to geographically smaller units. Among the eleven edges, the following are most directly relevant at sub-national scale (see TG-0.1 Figure 0.1.2)¹:

Edge	Direction	Relevance to Sub-National Accounts
Scope. TG-3.11 owns the spatial disaggregation of accounts compiled at national scale: boundary delineation, regionalisation methods, allocation keys, and which account types survive disaggregation. It introduces no new account, and cross-refers to the circular that owns each account for its structure.		

¶10 | E3 | FG1 to SG1 | Regional economic flows interacting with produced assets | | E9 | SG3 to FG1 | Local ecosystem services supplying sub-national economies | | E1 | FG1 to SG3 | Residual flows from regional industries to local ecosystems | | E11 | FG3 to SG3 | Intermediate ecosystem services within sub-national areas |

¶11 Edge directions follow the TG-0.1 Figure 0.1.2 convention. The textual “to” form is used in place of arrow symbols to ensure consistent rendering across the Observable site and PDF export.

3. Guidance Material

¶1 The SEEA Ecosystem Accounting framework establishes that accounting principles are equally applicable across different spatial scales and entities². For any given thematic accounting exercise, there is no a priori restriction on the geographical area, type of entity, or classification that must be applied. Choices of spatial scope should be made with a focus on the use of the accounts, including the potential to compare results over time and in different locations². This principle provides the foundation for sub-national ocean accounts: the same accounting structures used at national level –extent accounts, condition accounts, supply-use tables, asset accounts–can be compiled for provinces, municipalities, marine parks, or any other spatially delineated sub-national unit.

¶2 Sub-national compilation introduces specific methodological challenges that do not arise, or arise less acutely, at national level. These include the delineation of spatial units that serve both ecological and administrative purposes, the allocation of economic activity to sub-national areas when enterprises operate across boundaries, the treatment of cross-boundary ecosystem service flows, and the reconciliation of sub-national accounts with national totals. This section addresses each of these challenges in turn, drawing on the spatial accounting framework of SEEA EA Chapters 3 through 7 and the regionalisation methods developed through the EU Integrated System for Natural Capital Accounting (INCA) programme.

¶3 The EU INCA programme has demonstrated that national ecosystem accounts can be compiled from spatially explicit data at fine resolution (typically 100 m grid cells) and then aggregated to any administrative or ecological boundary³. This bottom-up approach, in which accounts are first compiled at fine spatial resolution and then aggregated upwards, is particularly well suited to sub-national ocean accounting because marine and coastal ecosystems rarely align with administrative boundaries. A coral reef system may span multiple municipal jurisdictions. A mangrove forest may straddle a provincial boundary, and a fish stock may range across the exclusive economic zones of several sub-national management authorities.

3.1 Sub-National Spatial Delineation

¶1 The first step in compiling sub-national ocean accounts is defining the spatial units for which accounts will be compiled. The SEEA EA identifies two fundamental spatial concepts: the ecosystem accounting area (EAA), which defines the total geographical scope, and the basic spatial unit (BSU), which is the smallest unit for which data are compiled⁴. At the national level, the EAA typically corresponds to the national territory plus the Exclusive Economic Zone. For sub-national accounts, the EAA is a portion of this national area, and the BSU is defined at a resolution appropriate to the management questions being addressed.

Defining sub-national accounting areas

¶1 Sub-national accounting areas should be delineated according to three criteria, balancing ecological coherence, administrative relevance, and data availability:

¶2 **Administrative boundaries** provide the most immediately useful delineation for sub-national accounts because they correspond to the jurisdictions of the decision-makers who will use the accounts. Provincial boundaries, municipal boundaries, coastal management zones, and marine protected area boundaries all serve as potential sub-national accounting areas. The SEEA EA notes that choices of geographical area should be made with a focus on the use of the accounts², and administrative boundaries maximise the alignment between accounting information and decision-making authority. Whilst they serve decision-making authority well, they rarely coincide with ecosystem boundaries, which can create challenges for measuring ecosystem extent and condition.

¶3 **Ecological boundaries** delineate areas based on ecosystem characteristics—bioregions, catchment-to-coast systems, large marine ecosystems, or habitat complexes. The IUCN Global Ecosystem Typology provides a hierarchical classification that can be used to define ecologically meaningful sub-national units for marine areas⁵. Ecological boundaries are particularly relevant when the management question concerns ecosystem-level processes (such as nutrient cycling, fish recruitment, or coastal protection) that operate independently of administrative divisions. The EU INCA programme adopted the river basin district as a key ecological boundary for freshwater accounts. Ecological units can therefore be used alongside administrative units³.

¶4 **Hybrid boundaries** combine administrative and ecological criteria. For example, a sub-national accounting area might be defined as a province's coastal zone, extending from the provincial boundary inland to include the coastal catchment and seaward to include the nearshore marine area. This approach is particularly useful for integrated coastal zone management, where the management unit spans the land-sea interface. The SEEA EA describes how ecosystem accounting areas can be defined to suit particular analytical purposes, provided that the boundaries are clearly documented and consistently applied⁶.

¶5 *Table 3.11.1: Comparison of spatial delineation approaches for sub-national ocean accounts*

Approach	Definition	Strengths	Limitations	Suitable Use Cases
Administrative	Provincial, municipal, or other jurisdictional boundaries	Aligns with decision-making authority; data often collected by jurisdiction	Ecosystems cross boundaries; marine areas may be poorly defined	Provincial economic accounts, municipal planning
Ecological	Bioregions, catchment-coast systems, large marine ecosystems	Captures ecosystem processes; supports ecological analysis	May not align with governance; economic data harder to allocate	Marine park management, ecosystem condition monitoring
Hybrid	Combining administrative and ecological criteria (e.g., provincial coastal zone)	Balances governance relevance with ecological coherence	Requires concordance with both administrative and ecological datasets	Integrated coastal zone management, marine spatial planning
Grid-based	Regular spatial grid (e.g., 1 km, 10 km cells)	Resolution-independent; supports aggregation to any boundary	No intrinsic meaning; requires overlay with both ecological and administrative units	Bottom-up compilation, remote sensing analysis

Basic spatial units for marine and coastal areas

¶1 The BSU is the smallest spatial unit at which ecosystem accounting data are compiled. For terrestrial ecosystem accounts, the EU INCA programme used grid cells of 100 m resolution, aggregated to 1 km reporting grids³. For marine and coastal sub-national accounts, the choice of BSU depends on the resolution of available data and the scale of the management questions being addressed. The SEEA EA does not prescribe specific grid sizes. The following implementation levels are indicative and should be aligned with the implementation readiness tiers established in **TG-0.8 Implementation Readiness Assessment**:

¶2 For coastal ecosystems (mangroves, seagrass meadows, coral reefs, salt marshes), remote sensing data from satellite platforms such as Sentinel-2 and Landsat provide spatial resolution of 10–30 m, enabling BSUs of 100 m to 1 km to be defined for extent mapping (see **TG-4.1 Remote Sensing and Geospatial Data**). For offshore areas where ecosystem type is inferred from bathymetry, substrate, and oceanographic conditions rather than direct observation, larger BSUs (1–10 km) may be appropriate. For pelagic environments, where ecosystem boundaries are dynamic and determined by water mass characteristics, even larger BSUs or feature-based delineation may be needed (see **TG-6.5 Pelagic and Open Ocean Accounts**).

¶3 The critical requirement is that BSUs can be aggregated consistently to any sub-national accounting area of interest. When accounts are compiled at fine spatial resolution using grid-based BSUs, they can be summed to administrative boundaries, ecological boundaries, or any hybrid unit, provided that spatial overlay procedures are applied consistently⁷. The SEEA EA emphasises that the choice of BSU should support the derivation of extent accounts, condition accounts, and ecosystem service flow accounts at the relevant spatial scale⁷.

¶4 For practical implementation, compilers should consider the following indicative implementation levels (these are not authoritative thresholds but reflect the available spatial data infrastructure at different capacity levels):

- ¶5 **Implementation Level 1 (coarse)**: Sub-national accounting areas defined by existing administrative boundaries (provinces, municipalities), with ecosystem type mapped at 1 km resolution from global datasets (e.g., Global Mangrove Watch, Allen Coral Atlas). Suitable for initial compilations and countries with limited spatial data capacity. Corresponds broadly to TG-0.8 Level 1 readiness⁸.

- ¶6 **Implementation Level 2 (moderate):** Sub-national accounting areas combining administrative and ecological boundaries, with ecosystem type mapped at 100 m–1 km resolution from national or regional remote sensing programmes. Supports condition indicators derived from remote sensing. Corresponds broadly to TG-0.8 Level 2 readiness⁸.
- ¶7 **Implementation Level 3 (fine):** Grid-based BSUs at 100 m resolution or finer, enabling flexible aggregation to any boundary. Requires a well-developed spatial data infrastructure and is consistent with the EU INCA methodology³. Corresponds broadly to TG-0.8 Level 3 or Level 4 readiness⁸.

Cross-boundary issues

¶1 Sub-national accounting areas inevitably encounter ecosystems, economic activities, mobile environmental assets, and environmental flows that cross their boundaries. Compilers must establish conventions for handling these cross-boundary issues to ensure that sub-national accounts are internally consistent and that they aggregate correctly to national totals.

¶2 **Ecosystem assets spanning boundaries:** When an ecosystem asset (e.g., a coral reef system or a mangrove forest) spans two sub-national accounting areas, the asset should be allocated to each area based on the physical extent within that area's boundary. This is conceptually straightforward for extent accounts (area in km² within each jurisdiction) but more complex for condition accounts, where a single condition indicator may apply to the ecosystem as a whole rather than to the portion within each jurisdiction. The preferred approach is to compile condition indicators for the BSUs falling within each accounting area and to aggregate these to the accounting area level, recognising that the condition of a cross-boundary ecosystem may differ between the portions in different jurisdictions.

¶3 **Economic activities spanning boundaries:** Enterprises may operate across multiple sub-national areas—a fishing fleet based in one province may harvest in waters managed by another. The SEEA CF and the 2025 SNA apply the residence principle, allocating economic activity to the area where the enterprise is resident⁹. For sub-national accounts, this means that the gross value added of a fishing enterprise is allocated to the province where the enterprise is registered, even if fishing takes place in another province's waters. Physical catch, in contrast, is recorded where extraction physically occurs. This produces two sub-national records with different geographic logic for the same industry: residence-based GVA and territory-based catch. Compilers should clearly document which view appears in each account and dashboard product, and include a memo item recording the cross-boundary share to prevent users from inadvertently summing the two records as though they refer to the same province (see **TG-3.3 Economic Activity Relevant to the Ocean**).

¶4 **Worked example: cross-boundary fleet**

¶5 A province-A-registered fishing enterprise extracts 800 tonnes from province-B waters.

- ¶6 **Province A economic accounts:** GVA attributed by residence = USD 1.2 M
- ¶7 **Province B physical accounts:** catch by territory = 800 t

¶8 Both records are correct and complementary. They should not be summed to infer a single provincial total.

¶9 The cross-boundary memo item reads: "Province A resident fleet operating in province B: 800 t (territory) / USD 1.2 M GVA (residence)."

¶10 **Mobile individual environmental assets:** Mobile environmental assets such as fish stocks pose particular allocation challenges because stock boundaries rarely align with administrative areas (see Table 3.11.4). Two candidate allocation conventions are available for sub-national fish-stock asset accounts: (i) a **historical catch share** convention, allocating the stock biomass across sub-national areas in proportion to their multi-year average share of total landings from the stock, and (ii) a **jurisdictional water area** convention, allocating in proportion to the area of each sub-national jurisdiction's waters falling within the stock's assessment range. The recommended default is the jurisdictional water area convention where stock-range maps are available, because it ties the asset record to the underlying spatial extent of the stock rather than to historical extractive performance.

Historical catch share should be used as a fallback when only landings data exist. All sub-national jurisdictions sharing a single stock must adopt the same convention, coordinated by the national compiler, so that sub-national asset records aggregate to a single national stock biomass without overlap or residual. Both conventions should reference the stock-assessment-unit conventions in **TG-6.7 Fisheries Stock Assessment**. For highly mobile pelagic stocks, the asset account may be best held at national level only, with sub-national accounts limited to catch and value flows allocated under the residence/territory rules above.

¶11 **Ecosystem service flows across boundaries:** Many marine ecosystem services benefit areas beyond the ecosystem's location. Coastal protection services from a mangrove forest in one municipality may protect infrastructure in an adjacent municipality. Carbon sequestration services benefit the global community. For sub-national accounts, compilers should record supply in the accounting area where the ecosystem is located and use in the area where the beneficiary resides, following SEEA EA Chapter 7. For global-public-good services such as carbon sequestration and biodiversity option values, where the beneficiary is the global community rather than any identifiable sub-national unit, allocate the use side to a Rest of World column in the sub-national use table. This treatment mirrors the SEEA EA handling of carbon sequestration as a service with a Rest of World beneficiary and ensures that sub-national use accounts can be summed to national totals without generating spurious residuals (see **TG-3.2 Flows from Environment to Economy**)¹⁰.

3.2 Regionalisation of National Supply-Use Tables

¶1 Regionalisation is the process of disaggregating national-level economic accounts into sub-national units. For ocean accounts, the primary target of regionalisation is the ocean economy supply-use table compiled following the guidance in **TG-3.3 Economic Activity Relevant to the Ocean**. Regionalisation enables sub-national authorities to understand the structure and scale of ocean economic activity within their jurisdiction. The choice between top-down, hybrid, and bottom-up regionalisation turns on what sub-national source data exist, with all three routes converging on a consistency check against national totals (Figure 3.11.1).

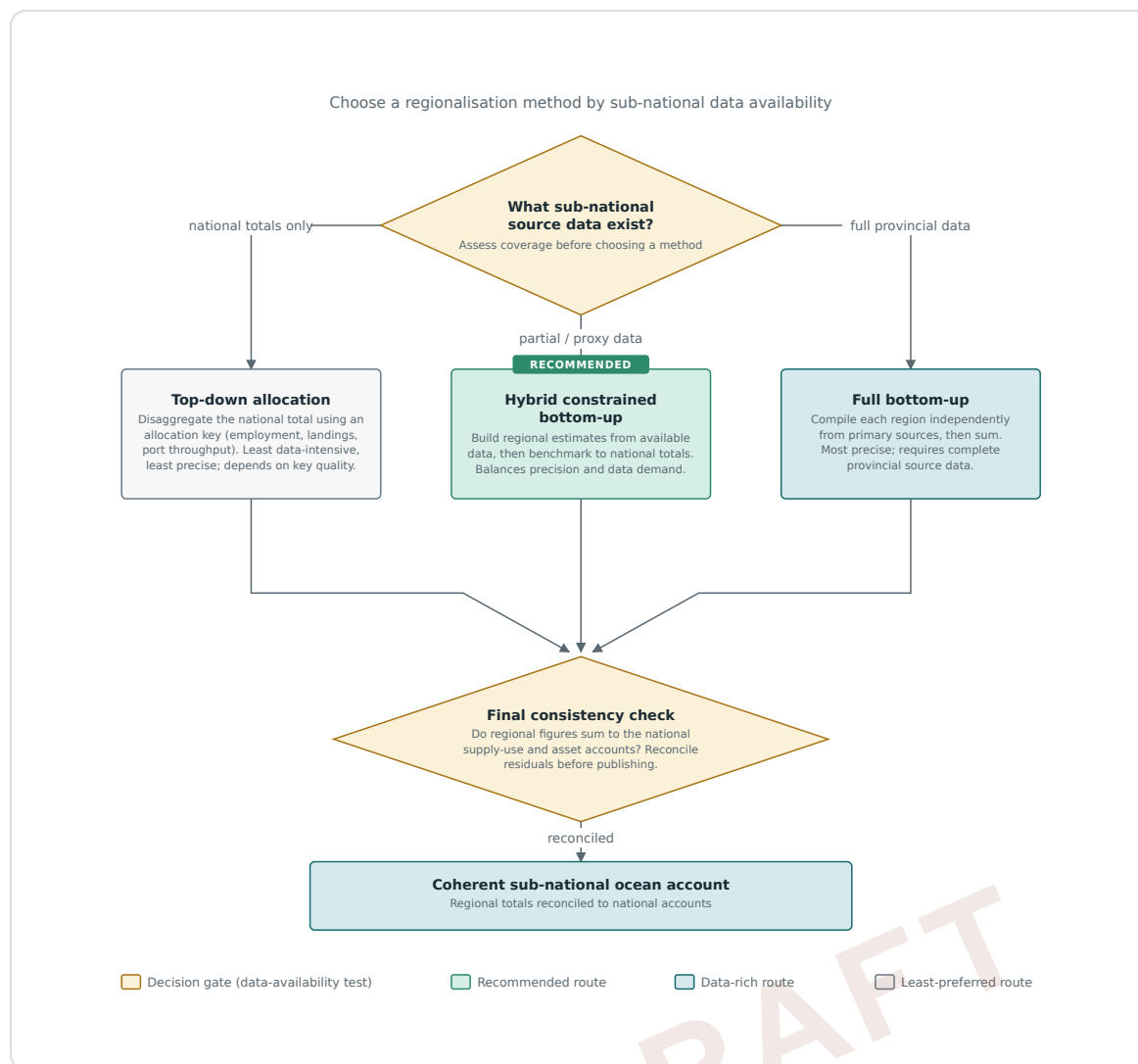


Figure 3.11.1 Sub-national ocean-account regionalisation is chosen by one gate: what sub-national source data exist? Routes are top-down proxy, hybrid constrained bottom-up (recommended), or full bottom-up; all end in a national consistency check.

Source: TG-3.11 draft, §3.2 (Regionalisation of National Supply-Use Tables).

Adapted from: SEEA EA 2024, §10.7-10.30 (sub-national ecosystem accounting), for the top-down / bottom-up method taxonomy.

Approaches to regionalisation

¶1 Three approaches to regionalisation are established in the regional accounting literature, each with different data requirements and precision levels:

¶2 **Top-down allocation** distributes national totals to sub-national units using allocation keys—proxy indicators that approximate the spatial distribution of economic activity. Common allocation keys for ocean economy accounts include:

- ¶3 Employment by industry and region (from labour force surveys or census data)
- ¶4 Number of enterprises by industry and region (from business registers)
- ¶5 Port throughput (for maritime transport industries)
- ¶6 Fisheries landings by port (for commercial fishing industries)
- ¶7 Tourist overnight stays by region (for coastal tourism industries)
- ¶8 Aquaculture production by region (for aquaculture industries)

¶9 For capital-intensive ocean industries (offshore oil and gas, port operations, shipbuilding), labour-based allocation keys may misallocate value added because labour productivity varies

across sub-national areas. Where independent regional GVA estimates are available for any industry—even partial or preliminary estimates from administrative sources—compilers should run a diagnostic comparison of implied regional labour productivity against the top-down assumption before finalising allocations. Where bottom-up industry totals do not match the national constraint, apply a proportional residual reallocation (or an RAS balancing procedure for full matrix reconciliation) and document the adjustment¹¹.

¶10 The advantage of top-down allocation is that it ensures consistency with national totals: in the pure top-down case, sub-national values sum exactly to the national figure. Once productivity adjustments or residual reallocations are applied, additivity is preserved through the documented balancing step. The disadvantage is that the accuracy of sub-national estimates depends on the quality of the allocation key.

¶11 **Bottom-up compilation** constructs sub-national accounts directly from regional data sources—regional business surveys, sub-national tax records, administrative data from provincial authorities. This approach can produce more accurate sub-national estimates but faces the challenge of ensuring consistency with national totals. The EU INCA programme adopted a bottom-up approach for ecosystem service accounts, compiling spatially explicit biophysical models at grid-cell level and aggregating to administrative boundaries³. For economic accounts, bottom-up compilation is feasible where sub-national statistical systems are well developed (see **TG-4.3 Administrative Data Sources**).

¶12 **Hybrid methods** combine top-down and bottom-up approaches. National totals from the SNA are allocated to sub-national units using bottom-up data as allocation keys. This approach ensures both consistency with national aggregates and use of the best available regional information. This approach is recommended by Eurostat for regional accounts and is well suited to ocean economy regionalisation¹¹.

¶13 Note that the §3.2 procedure produces an industry-by-region GVA and employment matrix (a regional industry account equivalent to a simplified supply-use view). It does not produce a full product-by-industry sub-national supply-use table (SUT). Table 3.11.4 (applicability matrix) rates full SUT sub-national feasibility as Low-Moderate for this reason. Compilers requiring a product-by-region dimension should consult Eurostat's *Manual of Regional Accounts Methods* and expand the procedure to include product allocation as a second stage¹².

¶14 *Table 3.11.2: Regionalisation methods for ocean economy supply-use tables*

Method	Data Requirements	Accuracy	National Consistency	Suitable Conditions
Top-down allocation	National SUT + regional allocation keys (employment, production)	Moderate – depends on allocation key quality	Guaranteed in pure top-down case	Limited sub-national data; initial compilation
Bottom-up compilation	Regional business surveys, tax records, administrative data	High – if data quality is adequate	Not guaranteed; requires balancing	Strong sub-national statistical systems
Hybrid (constrained bottom-up)	National SUT + regional data for key industries	High – combines local accuracy with national consistency	Achieved through documented balancing step	Intermediate data availability; recommended approach

Step-by-step regionalisation procedure

¶1 The following procedure describes how to regionalise national ocean economy supply-use tables for a set of sub-national areas (e.g., coastal provinces). This procedure assumes that a national ocean economy thematic account has already been compiled following **TG-3.3 Economic Activity Relevant to the Ocean**.

¶2 **Step 1: Define the sub-national areas.** Select the set of sub-national units for which ocean economy accounts will be compiled. These should correspond to the sub-national accounting areas defined in Section 3.1. Ensure that the union of all sub-national areas covers the national ocean accounting area without gaps or overlaps (for economic accounts, inland provinces without ocean frontage will have zero or near-zero ocean economy activity for most industries, but may have non-zero values for processing and trade industries).

¶3 **Step 2: Assemble regional allocation keys.** For each ocean-characteristic industry (as classified in **TG-3.3 Economic Activity Relevant to the Ocean**, Table 2, the ISIC-ocean economy concordance), identify the best available spatial indicator. Table 3.11.3 provides illustrative allocation keys for major ocean economy industries.

¶4 *Table 3.11.3: Illustrative allocation keys for ocean economy regionalisation*

Ocean Economy Industry	Type	Allocation Basis	Recommended Allocation Key	Data Source
Marine fishing (GVA)	Ocean-dependent	Residence	Enterprise register: GVA by province of registration	Business register, fisheries authority licensing
Marine fishing (physical catch)	Ocean-dependent	Territory	Fish landings value/volume by port	Fisheries authority landing records
Aquaculture	Ocean-dependent	Territory (= residence for fixed installations)	Aquaculture production value by region	Aquaculture licences and production surveys
Fish processing	Ocean-related	Establishment	Employment in fish processing by region	Labour force survey, business register
Coastal tourism	Ocean-related (partial)	Territory	Tourism expenditure or overnight stays by region (apply ocean-share ratio from TG-3.3 Table 2 before allocating)	Tourism satellite account, accommodation surveys
Maritime transport (GVA)	Ocean-dependent	Residence	Shipping operator register by province of registration	Maritime authority operator registry
Maritime transport (physical throughput)	Ocean-dependent	Territory	Port throughput (tonnage handled) by port	Port authority statistics
Offshore oil and gas	Ocean-related (partial)	Territory	Production value by field/block location (apply ocean-share ratio from TG-3.3 Table 2 before allocating)	Petroleum authority production data
Shipbuilding and repair	Ocean-related	Establishment	Employment in shipbuilding by region (apply ocean-share ratio from TG-3.3 Table 2 before allocating)	Business register
Coastal construction	Ocean-related (partial)	Establishment	Construction permits and value by coastal municipality (apply ocean-share ratio from TG-3.3 Table 2 before allocating)	Building permit records
Marine research (ocean-related)	Ocean-related (partial)	Establishment	Research expenditure by institution location (apply ocean-share ratio from TG-3.3 Table 2 before allocating)	Research funding databases

¶5 **Reconciling Table 3.11.3 with the §3.1 residence rule.** The “Allocation Basis” column reconciles Table 3.11.3 with the residence-vs-territory rule established in §3.1. For mobile-fleet industries (marine fishing, maritime transport), the table distinguishes residence-basis keys for GVA from territory-basis keys for physical activity, and compilers should populate both records following the worked example in §3.1. For fixed-installation industries (aquaculture, ports, offshore platforms, processing plants, shipyards), residence and establishment effectively coincide so a single allocation key suffices. For all industries classified as “Ocean-related (partial)” (including coastal tourism, offshore oil and gas, shipbuilding and repair, coastal construction, and marine research) the regional allocation key must be multiplied by the industry-specific ocean-share ratio from TG-3.3 Table 2 before applying the Step 3 formula, so that the regional total does not over-state ocean-economy activity by absorbing inland-attributable or non-ocean activity captured in the underlying expenditure, employment, or permit data.

¶6 **Step 3: Allocate national values.** For each industry, distribute the national supply-use table entries to sub-national areas in proportion to the allocation key. For a given industry i and sub-national area r , the allocated gross value added is:

$$¶7 \text{ GVA}(i,r) = \text{GVA}(i,\text{national}) \times \text{Key}(i,r) / \text{Key}(i,\text{total})$$

¶8 where $\text{Key}(i,r)$ is the allocation key value for industry i in area r and $\text{Key}(i,\text{total})$ is the national total of the allocation key. For capital-intensive industries where an employment key is used, check whether implied regional labour productivity is broadly consistent with any available independent estimate. If bottom-up totals differ from the national constraint, apply a proportional residual reallocation and document the balancing step.

¶9 **Step 4: Balance and validate.** Check that sub-national values sum to national totals for each industry (if a product-dimension regionalisation is also undertaken as a separate stage, balance products on the supply and use sides separately). Where bottom-up data are available for specific industries (e.g., fisheries landings data are typically available by port), use these to validate or adjust the top-down allocations. Document any discrepancies and the adjustments made to resolve them. Apply the quality assurance procedures described in **TG-0.7 Quality Assurance Principles**.

¶10 **Step 5: Compile regional ocean economy indicators.** From the regionalised supply-use tables, derive sub-national ocean economy indicators including regional ocean economy GVA, ocean economy share of regional GDP, ocean economy employment by industry, and labour productivity by ocean industry. These indicators enable comparison across sub-national areas and identification of regional specialisation patterns (see **TG-2.5 Structure and Function of the Ocean Economy**). Note that derived ratios computed at this step (ocean economy share of regional GDP, labour productivity by industry, and other intensity measures) are not additive across sub-national areas. The area-weighted-mean treatment recommended in §3.5 for condition indices applies in principle to these economy ratios as well: a national ratio cannot be computed by simple summation of sub-national ratios and must be derived from the underlying levels.

Challenges and limitations

¶11 Regionalisation of ocean economy accounts faces several specific challenges that compilers should anticipate:

¶12 **Confidentiality constraints:** In small sub-national areas, individual enterprises may dominate particular industries, making it impossible to publish industry-level data without revealing individual enterprise information. Compilers may need to aggregate industries or suppress cells in sub-national tables to comply with statistical confidentiality requirements. This is particularly common for offshore energy, where a single installation may constitute the entire industry in a given sub-national area (see **TG-3.10 Offshore Energy Accounts**).

¶13 **Headquarters versus establishment allocation:** National accounts record economic activity at the enterprise level, which may be attributed to the headquarter location rather than the establish-

ment where production occurs. For ocean economy industries where the headquarter and the establishment are in different sub-national areas (e.g., a fishing company headquartered in the capital city but operating from a regional port), the allocation should ideally be to the establishment location. Business register data with establishment-level information support this allocation.

¶4 **Informal economy:** In many countries, much ocean economic activity occurs in the informal sector—small-scale fishing, informal coastal tourism, artisanal aquaculture. These activities are poorly captured in national accounts and even less visible in regional data. Where the national supply-use table is exhaustiveness-adjusted (i.e., it already includes an estimate of informal activity), sub-national accounts should regionalise the adjusted national total and document the informal component within the regional figure rather than adding informal estimates on top. Where the national table is not exhaustiveness-adjusted, add a supplementary informal-economy memo row at sub-national level rather than altering the regional total, to avoid breaking national consistency (see **TG-4.2 Survey Methods for Ocean Economic Activity**)¹³.

¶5 **Temporal misalignment:** National supply-use tables and sub-national allocation keys may refer to different time periods or use different reference dates. Compilers should verify temporal alignment and adjust for any systematic biases introduced by timing differences, following the general guidance on temporal consistency in **TG-0.2 Overview of Relevant Statistical Standards**.

3.3 Provincial/Local Asset Accounts and Ecosystem Extent/Condition

¶1 This section provides the sub-national applicability matrix, a reference for determining which ocean account types can be compiled at sub-national scales, what spatial resolution is needed, and what specific considerations apply. The matrix is followed by detailed guidance on compiling ecosystem extent and condition accounts at sub-national scales, drawing on SEEA EA Chapters 4 and 5.

¶2 A unified illustrative entity is used throughout §3.3 and §3.5. From this version onward, the worked examples in Tables 3.11.5 (extent), 3.11.6 (condition), and 3.11.7 (dashboard) are all compiled for a single illustrative entity, the **Province X Coastal Zone** (an administrative composite accounting area combining the Province X coastal jurisdiction with the embedded Marine Park Y management area), spanning two accounting periods (2024–2025). Table 3.11.5 reports the extent account for the 2025 period (closing stock as at end-2025); Table 3.11.6 reports the condition account for the same entity using 2024–2025 paired observations from the Marine Park Y monitoring programme (which is the most data-rich subset of the Province X Coastal Zone); and Table 3.11.7 presents the integrated dashboard, whose indicator values are derived from these two upstream tables together with indicative three-year trends extrapolated from the same monitoring series. Where a dashboard indicator cannot be derived from Tables 3.11.5–3.11.6 (e.g., catch / sustainable yield, which requires a stock-assessment account not compiled in this worked example), the dashboard cell is marked “n/a – not illustrated” rather than populated with hypothetical values. Trace-back from each dashboard cell to the underlying account table is provided in the “Account Source” column of Table 3.11.7.

Sub-national applicability matrix

¶1 The following matrix summarises the sub-national applicability of each account type covered by the Technical Guidance circulars.

¶2 *Table 3.11.4: Sub-national applicability matrix for ocean account types*

Account Type	TG Circular	Sub-National Feasibility	Minimum Spatial Resolution	Key Data Requirements	Special Considerations
Ecosystem extent	TG-3.1	High	100 m – 1 km grid	Remote sensing imagery, habitat maps	Can be compiled at any spatial scale where mapping data exist; grid-based approach supports flexible aggregation
Ecosystem condition	TG-3.1	High	1 – 10 km grid	In situ monitoring, remote sensing indices	Condition indicators may require local calibration; monitoring station density varies by region
Individual environmental assets (fish stocks)	TG-3.1 , TG-6.7	Moderate	Stock assessment unit	Stock assessments, catch data by area	Stock boundaries rarely align with administrative areas; default allocation is the jurisdictional water area convention (historical catch share as fallback); all sharing jurisdictions must adopt the same convention coordinated by the national compiler. Full guidance in §3.1.
Individual environmental assets (minerals, energy)	TG-3.1 , TG-3.10	High	Licence block / field	Production data by field or block	Data typically available at field level; confidentiality may limit publication
Ecosystem service flows (physical)	TG-3.2	High	100 m – 1 km grid	Biophysical models, land/sea cover maps	EU INCA methodology demonstrated at 100 m resolution; marine models available for key services. Global-public-good services (carbon sequestration, biodiversity option value) require Rest of World use allocation (see §3.1).
Ecosystem service flows (monetary)	TG-3.2 , TG-1.9	Moderate	Ecosystem type / region	Valuation models, regional price data	Valuation parameters (unit values, discount rates) may need regional adjustment. Global-public-good services (carbon sequestration, biodiversity option value) require Rest of World use allocation (see §3.1).
Ocean economy GVA and employment	TG-3.3	Moderate	Province / municipality	Regional economic data, allocation keys	Requires regionalisation (Section 3.2); confidentiality constraints in small areas

Account Type	TG Circular	Sub-National Feasibility	Minimum Spatial Resolution	Key Data Requirements	Special Considerations
Supply-use tables	TG-3.3	Low-Moderate	Province (with caveats)	Regional production and trade data	The §3.2 procedure produces a regional industry account (GVA × region matrix), not a full product-by-industry SUT; the latter requires additional product-dimension regionalisation (see text)
Residual flows (pollution)	TG-3.4	High	Point source / catchment	Discharge permits, monitoring data, runoff models	Point-source data inherently spatial; diffuse pollution requires catchment modelling
Social accounts	TG-3.5	Moderate	Province / municipality	Household surveys, census data	Survey sample sizes may be insufficient for fine sub-national disaggregation
Traditional knowledge	TG-3.6	High	Community / cultural area	Community engagement, participatory mapping	Inherently local; community-based recording methods are well suited to sub-national compilation
Governance accounts	TG-3.7	High	Management area / jurisdiction	Legal instruments, management plans, MPA boundaries	Governance arrangements are typically defined at sub-national scales
Combined presentations	TG-3.8	High	Depends on component accounts	All relevant component accounts at sub-national level	Only as strong as the weakest component; partial compilations are valuable
Aquaculture accounts	TG-3.9	High	Licence / farm / region	Aquaculture production data, licence records	Production data typically available at farm or region level
Offshore energy accounts	TG-3.10	High	Licence block / field	Production and revenue data by field	Confidentiality is the main constraint, not spatial data availability

¶3 The matrix indicates that ecosystem-based accounts (extent, condition, ecosystem services, residual flows) generally have high sub-national feasibility because they are compiled from spatially explicit data sources—remote sensing, monitoring stations, biophysical models. Economic accounts present more challenges because the SNA recording conventions (residence-based, enterprise-level) do not always map easily to sub-national geography. Social accounts face sample-size constraints when disaggregated to small areas.

¶4 Compilers should use this matrix to plan a realistic scope for sub-national compilation. A pragmatic approach begins with the account types that have high sub-national feasibility (extent, condition, governance) and progressively adds more challenging account types (economic activity, social accounts) as data systems develop. This incremental approach is consistent with the implementation readiness guidance in **TG-0.8 Implementation Readiness**.

Ecosystem extent accounts at sub-national scale

¶1 Ecosystem extent accounts record the area of each ecosystem type within a defined accounting area, including additions and reductions during the accounting period¹⁴. At sub-national scales, extent accounts can be compiled at high spatial resolution using remote sensing data, providing detailed maps of ecosystem distribution and change that are directly useful for local planning and management.

¶2 The SEEA EA defines extent as the area of each ecosystem type, measured in consistent spatial units (typically hectares or square kilometres)¹⁴. For sub-national accounts, the compilation process follows the same structure as national extent accounts (see **TG-3.1 Asset Accounts**, Section 3.5.1) but operates at finer spatial resolution and within the boundaries of the sub-national accounting area.

¶3 Key considerations for sub-national extent accounts include:

¶4 **Ecosystem type classification at fine resolution:** The ecosystem type classification used for national accounts may need refinement for sub-national purposes. For example, a national extent account may record “coral reef” as a single ecosystem type, whereas a marine park manager may need to distinguish between fringing reefs, barrier reefs, and patch reefs. The IUCN Global Ecosystem Typology provides a hierarchical classification that supports this refinement—Level 3 (ecosystem functional groups) provides the national classification, whilst Level 4 or Level 5 (biogeographic ecotypes or local ecosystem subgroups) can be used for sub-national detail⁵. Compilers should document the classification used and provide concordance tables linking sub-national types to the national classification.

¶5 **Change detection and attribution:** Sub-national extent accounts should record net change in ecosystem extent and identify the drivers of that change. At local scales, it is often possible to attribute extent changes to specific causes—land conversion for coastal development, aquaculture expansion into mangrove areas, storm damage to coral reefs, or restoration activities. Attributing changes to drivers strengthens the policy relevance of sub-national accounts by enabling targeted management responses. The EU INCA programme demonstrated change-attribution methods by overlaying land-cover change maps with land-use planning data³.

¶6 **Accounting for managed ecosystems:** Sub-national areas, particularly marine protected areas and coastal reserves, may contain ecosystems under active management or restoration. Extent accounts for these areas should distinguish between natural ecosystem extent and managed or restored extent, documenting the investment in ecological restoration as a form of ecosystem asset enhancement (see **TG-6.2 Mangrove and Coastal Wetland Accounting** for mangrove restoration accounting).

¶7 *Table 3.11.5: Illustrative sub-national ecosystem extent account (Province X Coastal Zone, 2024–2025)*

Ecosystem Type	Opening Extent (km ²)	Managed Expansion	Natural Expansion	Managed Reduction	Conversion to Other Use	Net Change (km ²)	C E (l
Mangroves	85.2	+2.1	+0.3	0.0	-1.8	+0.6	8
Seagrass meadows	42.7	0.0	+0.1	0.0	-0.9	-0.8	4
Coral reefs	128.5	0.0	0.0	0.0	-0.2	-0.2	1
Salt marshes	18.3	+0.8	+0.1	0.0	-0.5	+0.4	1
Sandy shores	22.6	0.0	+0.2	0.0	-1.1	-0.9	2
Continental shelf waters	650.0	–	–	–	–	– ¹⁵	6
Total (mapped ecosystems, excl. shelf – see¹⁵)	297.3	+2.9	+0.7	0.0	-4.5	-0.9	2

Ecosystem Type	Opening Extent (km ²)	Managed Expansion	Natural Expansion	Managed Reduction	Conversion to Other Use	Net Change (km ²)	C E (l
Total accounting area (incl. shelf, constant assumption)	947.3	+2.9	+0.7	0.0	-4.5	-0.9	9

Ecosystem condition accounts at sub-national scale

¶1 Ecosystem condition accounts record the quality or health of ecosystems using indicators that capture biotic and abiotic characteristics¹⁶. The SEEA EA organises condition indicators into six groups: physical state, chemical state, compositional state, structural state, functional state, and landscape-level characteristics¹⁶. At sub-national scales, condition accounts can draw on local monitoring data that may provide richer detail than national monitoring networks.

¶2 Sub-national condition accounts present both opportunities and challenges relative to national accounts:

¶3 **Opportunities:** Local monitoring programmes—conducted by marine park authorities, provincial environment agencies, university research stations, or citizen science programmes (see **TG-4.4 Citizen Science**)—often collect condition data at higher temporal and spatial resolution than national monitoring networks. Reef health surveys within marine protected areas, water quality monitoring at local stations, seagrass shoot density measurements by research teams, and bird counts by volunteer networks all provide condition data that can be incorporated into sub-national accounts. The integration of research data into accounting frameworks is addressed in **TG-4.5 Research Data**.

¶4 **Challenges:** Condition indicators require reference levels against which current condition is assessed. The SEEA EA recommends establishing reference condition based on the state of ecosystems at a specified reference time, in the absence of human influence, or at a level required to sustain a target level of ecosystem services¹⁶. At sub-national scales, reference condition may vary across the accounting area due to natural environmental gradients (e.g., reef condition naturally varies with depth, exposure, and latitude). Compilers should use spatially explicit reference conditions where possible, rather than applying a single national reference level across all sub-national areas.

¶5 *Table 3.11.6: Illustrative sub-national ecosystem condition account (Province X Coastal Zone – Marine Park Y subset, 2024–2025)*

Condition Indicator	Direction	Ecosystem Type	Unit	Upper Reference (VH)	Lower Reference (VL)	2024 Value	2025 Value
Live coral cover	Positive	Coral reefs	%	60	0	38	35
Water clarity (Secchi depth)	Positive	Coral reefs	metres	25	0	18	17
Seagrass shoot density	Positive	Seagrass meadows	shoots/m ²	800	0	520	490
Canopy height	Positive	Mangroves	metres	12	0	8.5	8.7
Reef fish species richness ¹⁸	Positive	Coral reefs	number	200	0	142	138
Nutrient concentration (DIN)	Negative	Coastal waters	ug/L	5	20	8.2	9.1

¶6 **Interpreting sub-national condition accounts:** The normalisation procedure for condition indicators (including positive- and negative-direction rescaling, bounding to [0, 1], and reference condition establishment) follows **TG-2.1 Biophysical Indicators for Ocean Accounts** Section 3.4.1.

The Δ Index column (closing minus opening rescaled index) is the headline accounting output for condition change, encoding direction automatically so that a negative Δ always denotes worsening condition regardless of whether the underlying raw indicator is positive- or negative-direction.

¶7 An aggregate condition index for each ecosystem type can be derived using an area-weighted mean of individual indicator indices as the default, where sub-units differ in extent. The aggregation operates within a single ecosystem type: indices for different ecosystem types (e.g., coral reefs and mangroves) are not pooled into a single composite without an explicit reweighting choice. For sub-national decision-makers, the disaggregated indicator-level data are often more useful than aggregate indices, as they point directly to the specific pressures requiring management intervention.

3.4 Enterprise-Level Attribution from National Totals

¶1 Sub-national disaggregation and enterprise-level attribution are the same problem at different grain. Sections 3.1 to 3.3 disaggregate national totals to an administrative or ecological area; corporate reporting under TNFD, IFRS S1 and CSRD requires the further step of expressing a single firm's dependence on, or contribution to, the totals for the area it operates in (**TG-1.11 OA and the Private Sector** Section 3.5).

¶2 **Spatial overlay is the starting point, not the answer.** A firm intersects its asset locations or sourcing geographies with the spatially disaggregated accounts to obtain area-level figures. The precision of the result is bounded by the resolution of the underlying compilation (**TG-2.12** Section 3.3), and an overlay performed without the reconciliation in Section 3.2 will produce site-level figures that do not sum to the national totals they were derived from. That failure is the principal reason corporate disclosures cannot be verified against national statistics, which is the value the accounts are supposed to supply.

¶3 **Attribution depends on the service type.** For provisioning services with established harvest or extraction reporting – commercial fisheries, aquaculture, aggregates – a firm's reported volume can be expressed as a proportion of total national extraction, and a corresponding share of the ecosystem service use attributed to it. For regulating and cultural services there is no equivalent reported quantity, and attribution rests on contribution analysis: expressing the firm's dependence on, or effect upon, an ecosystem function as a function of its physical presence and activity intensity at the relevant location. Contribution analysis is an approximation and should be reported as one.

¶4 **The accounts supply the denominator.** In both cases the national or area account provides the total against which a firm-level figure is expressed as a share. Compilers responding to enterprise requests should supply the denominator and its basis rather than a firm-specific figure, which the firm is better placed to compute and is responsible for.

¶5 Where sector guidance from the TNFD or methods from the Science Based Targets Network specify an attribution approach for a given realm, that approach takes precedence; this section covers the case where none is specified.

3.5 Linking Sub-National Accounts to Local Planning

¶1 Sub-national ocean accounts achieve their full value when they are integrated into local planning and decision-making processes. This requires institutional arrangements that connect the compilation of accounts to the governance processes that will use them, and analytical frameworks that translate accounting data into planning-relevant information.

Institutional arrangements for sub-national compilation

¶1 The compilation of sub-national ocean accounts requires coordination between national statistical offices (which compile national accounts and maintain statistical standards), sub-national government agencies (which hold local data and make local decisions), and specialised agencies (marine park authorities, fisheries agencies, port authorities) that operate at sub-national scales.

The SEEA EA notes that “much of the information required to compile ocean accounts is common to other communities of practice including those for marine spatial planning, disaster risk and climate change” and that “one objective of the ocean accounting community of practice is to ensure that these common data are standardized and shared”²⁰.

¶2 Effective institutional arrangements for sub-national compilation typically involve three elements. First, a national coordination body (often the national statistical office or a designated environment-economy accounting unit) establishes methodological standards and ensures that sub-national accounts are consistent with national accounts and with international standards. This coordination function is described in **TG-4.7 National Data Coordination Architectures**. Second, sub-national compilation teams, located within provincial statistical offices, coastal management authorities, or marine park agencies, assemble local data and compile accounts following the national methodology. Third, a data harmonisation process ensures that sub-national accounts use consistent classifications, reference periods, and measurement units, enabling aggregation to national totals and comparison across sub-national areas (see **TG-4.6 Data Harmonisation and Interoperability**).

Connecting accounts to planning instruments

¶1 Sub-national ocean accounts can inform several categories of local planning instruments:

¶2 **Marine spatial plans:** Sub-national extent accounts provide the baseline mapping of ecosystem distribution that underpins spatial zoning. Condition accounts identify areas under stress that may warrant protective zoning. Economic activity accounts reveal the spatial distribution of competing uses. Combined presentations (see **TG-3.8 Combined Presentations**) integrate these data into the analytical framework required by marine spatial planning processes (see **TG-1.2 Marine Spatial Planning**).

¶3 **Protected area management plans:** Marine park management plans typically require monitoring data on ecosystem condition, visitation levels, and compliance with regulations. Sub-national accounts provide a structured framework for organising this monitoring data, tracking trends over time, and linking ecosystem condition to management actions. The governance accounts described in **TG-3.7 Governance Accounts** complement ecological and economic accounts by documenting management inputs and processes.

¶4 **Coastal development plans:** Municipal and provincial governments planning coastal development require information on the trade-offs between development and ecosystem services. Sub-national accounts quantify these trade-offs by showing how ecosystem extent and condition changes affect the flow of ecosystem services (coastal protection, fish provisioning, recreation) and the economic and social consequences for local communities.

¶5 **Disaster risk management:** Coastal communities face risks from storms, flooding, and sea-level rise. Sub-national accounts documenting the extent and condition of protective ecosystems (mangroves, coral reefs, salt marshes), the economic assets at risk, and the population exposure support disaster risk assessment and adaptation planning (see **TG-2.9 Disaster Risk Indicators**).

Aggregation and national consistency

¶1 A fundamental principle of sub-national accounting is that sub-national accounts should aggregate to national totals. This principle ensures that sub-national information is consistent with national reporting and that national accounts can be disaggregated to reveal sub-national patterns. The SEEA EA states that the choice of geographical area and entities should support the potential to compare results over time and in different locations².

¶2 In practice, exact aggregation is achievable for extent accounts (the sum of ecosystem extent across all sub-national areas equals the national extent) and for economic-account levels (GVA, employment, output) compiled using pure top-down allocation, where by construction sub-national values sum to national totals. In hybrid procedures (Section 3.2) that combine top-down allocation

with bottom-up evidence or productivity-adjusted keys, additivity at the level is preserved instead through the documented residual-reallocation step rather than by construction. Derived ratios (ocean economy share of regional GDP, labour productivity by ocean industry, and similar intensity measures generated at Step 5 of the §3.2 procedure) are not additive across sub-national areas: a national ratio cannot be recovered by summing or simply averaging sub-national ratios and must be computed from the underlying levels. Condition accounts likewise do not satisfy additivity: the national condition index cannot be computed by simple summation of sub-national values. The preferred aggregation method for both condition indices and derived economy ratios is an area-weighted (or activity-weighted) mean, where each sub-national value is weighted by the relevant denominator (ecosystem area for condition indices, and GDP, employment, or output for economy ratios).

¶3 Worked aggregation example

¶4 Suppose two sub-national areas compile coral reef condition indices independently:

- ¶5 **Area A:** index = 0.65, reef area = 80 km²
- ¶6 **Area B:** index = 0.50, reef area = 40 km²

¶7 The national area-weighted aggregate:

¶8 $(0.65 \times 80 + 0.50 \times 40) / (80 + 40) = (52 + 20) / 120 = \mathbf{0.60}$

¶9 Compilers should document this formula and note that condition indices are not additive: discrepancies between this aggregated figure and an independently compiled national condition account should be recorded and investigated.

3.6 Dashboard Design for Local Decision-Makers

¶1 Sub-national ocean accounts generate data that must be communicated effectively to local decision-makers—provincial governors, municipal mayors, marine park managers, coastal zone management authorities. These users typically require concise, visually accessible summaries rather than detailed accounting tables, organised around the management questions relevant to their jurisdiction.

¶2 The illustrative dashboard in Table 3.11.7 is compiled for the same unified entity (the **Province X Coastal Zone**) introduced in §3.3, and its indicator values are derived from the upstream Tables 3.11.5 (extent) and 3.11.6 (condition). The dashboard “Account Source” column traces each cell back to its source account and table row. Trend cells use indicative three-year extrapolations of the same monitoring series. Where an indicator cannot be derived from the upstream tables (e.g., catch / sustainable yield, which requires a stock-assessment account), the cell is marked “n/a – not illustrated” and a footnote explains the missing upstream account.

Principles of dashboard design

¶1 Effective sub-national ocean account dashboards follow the design principles set out in **TG-3.8 Combined Presentations** Section 3.5 (management-question orientation, trend emphasis, peer benchmarking). Two additional considerations are distinctive to sub-national use and warrant emphasis here:

- ¶2 **Spatial visualisation:** Present information as maps wherever possible. Sub-national accounts are inherently spatial, and a single map often communicates condition or pressure patterns more effectively than tabulated indicators.
- ¶3 **Sub-national peer benchmarking:** Where accounts are compiled for multiple sub-national areas, include cross-jurisdictional comparison alongside national benchmarks so that local decision-makers can identify peer regions for best-practice learning.

Illustrative dashboard structure

¶1 The following table illustrates a dashboard structure for the Province X Coastal Zone, drawing indicators from the upstream extent and condition accounts (Tables 3.11.5–3.11.6) and a small set of

economic and social indicators introduced at dashboard stage. The benchmark columns are split into value (a comparable national figure or target) and trend (the national rate of change), using explicit codes where national benchmarks are unavailable: “n/c” = not compiled at national level, and “n/a” = indicator does not apply at national scale.

¶2 Table 3.11.7: Illustrative sub-national ocean accounts dashboard (Province X Coastal Zone)

Domain	Indicator	Value	Trend (indicative, 3-year) ²¹	Benchmark Value (National)	Benchmark Trend (National)	Account Source
Ecosystem extent	Total coastal/marine ecosystem area (km ²)	946	Declining (-0.1%/yr)	n/c	n/c	Extent account (TG-3.1); Table 3.11.5 closing accounting-area total (946.4 km ² , rounded)
Ecosystem extent	Mangrove area (km ²)	85.8	Increasing (+0.7%/yr)	n/c	National total declining	Extent account (TG-3.1); Table 3.11.5 mangrove closing extent; trend = +0.6 / 85.2 ≈ +0.70%/yr
Ecosystem condition	Coral reef condition index (0–1)	0.58	Declining (-0.05/yr)	0.62	-0.02/yr	Condition account (TG-3.1); Table 3.11.6 live coral cover index 2025; Δ Index = -0.05
Ecosystem condition	Water quality index (0–1, DIN-derived)	0.73	Declining (-0.06/yr)	0.78	-0.02/yr	Condition account (TG-3.1); biophysical indicator catalogue (TG-2.1); Table 3.11.6 DIN-derived index 2025; Δ Index = -0.06

Domain	Indicator	Value	Trend (indicative, 3-year) ²¹	Benchmark Value (National)	Benchmark Trend (National)	Account Source
Ecosystem services	Fish provisioning (tonnes/yr)	n/a – not illustrated ²²	n/a	n/a	n/a	Flow account (TG-3.2); upstream physical-flow account not compiled in this worked example
Ecosystem services	Coastal protection (km of coastline)	n/a – not illustrated ²²	n/a	n/a	n/a	Flow account (TG-3.2); upstream physical-flow account not compiled in this worked example
Ecosystem services	Blue carbon sequestration (tCO ₂ e/yr, use = Rest of World) ²³	n/a – not illustrated ²²	n/a	n/a	n/a	Flow account (TG-3.2); upstream physical-flow account not compiled in this worked example; Rest of World convention illustrated in §3.1
Ocean economy	Ocean economy GVA (million USD)	n/a – not illustrated ²⁴	n/a	n/c	+2.8%/yr	Economic account (TG-3.3); upstream regionalised SUT not compiled in this worked example
Ocean economy	Ocean economy employment	n/a – not illustrated ²⁴	n/a	n/c	+1.2%/yr	Economic account (TG-3.3); upstream regionalised SUT not compiled in this worked example

Domain	Indicator	Value	Trend (indicative, 3-year) ²¹	Benchmark Value (National)	Benchmark Trend (National)	Account Source
Sustainability	Fish catch / sustainable yield (%)	n/a – not illustrated ²⁵	n/a	n/a	n/a	Asset account (TG-3.1, TG-6.7); stock assessment not compiled in this worked example
Governance	MPA coverage (% of zone)	n/a – not illustrated ²⁶	n/a	n/a	n/a	Governance account (TG-3.7); upstream governance account not compiled in this worked example
Social	Coastal poverty rate (%)	n/a – not illustrated ²⁶	n/a	n/a	n/a	Social account (TG-3.5); upstream social account not compiled in this worked example

From dashboard to action

¶1 Dashboards are communication tools, not ends in themselves. Their value depends on the extent to which they inform management decisions. Compilers should work with local decision-makers to identify the specific decisions that dashboard indicators will inform, establish indicator thresholds or targets that trigger management responses, and create feedback loops between management actions and subsequent account updates that demonstrate whether interventions are achieving their intended effects.

¶2 For example, the worked-example dashboard above (populated only where upstream accounts have been compiled) indicates that the Province X Coastal Zone's coral reef and water-quality condition indices have both declined over the 2024–2025 period (Δ -0.05 and -0.06 respectively, from Table 3.11.6), whilst mangrove extent has increased (+0.6 km² from Table 3.11.5) under an active restoration programme. A policy response might extend the mangrove restoration approach to seagrass and coral reef ecosystems and invest in water quality improvement to address the declining condition index. Subsequent accounting periods would reveal whether these interventions are effective. This would create an adaptive management cycle informed by sub-national ocean accounts. In an operational compilation, the remaining dashboard rows (ecosystem services, ocean economy, governance, social) would be populated from the corresponding upstream accounts. The "n/a – not illustrated" entries flag scope decisions that compilers should make explicit when planning their own dashboards.

¶3 The country case studies in **TG-5.5 Indonesia** and **TG-5.1 Australia** provide examples of sub-national ocean accounting in practice. They demonstrate how accounts compiled for specific regions or sites have been used to inform local management decisions.

Implementation Considerations

¶1 For minimum institutional capacity, data infrastructure, and human skills requirements for compiling these accounts, see [TG-0.8 Implementation Readiness Assessment](#).

4. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

5. References

1. ¶1 The edge mapping reproduced in this box is anchored to TG-0.1 Figure 0.1.2 as of TG-0.1 v0.6.0. Future revisions of TG-0.1 may renumber edges or revise the framework diagram; compilers should verify the current edge identifiers against the latest TG-0.1 before publishing sub-national accounts that rely on this mapping.
2. ¶2 SEEA EA (2021), paras. 13.9–13.10. “For any given thematic accounting exercise, there is no a priori restriction on the geographical area, type of entity or classification that must be applied.” and “Accounting principles are themselves equally applicable across different spatial scales and entities and are unaffected by the choice of classification. These choices should therefore be made with a focus on the use of the accounts, including the potential to compare results over time and in different locations.”
3. ¶3 European Commission (2021), *Integrated system of Natural Capital and ecosystem services Accounting in the EU (INCA)*. Statistical Report, Eurostat. The INCA programme compiled ecosystem extent, condition, and ecosystem service accounts at 100 m grid resolution across the EU territory, demonstrating bottom-up spatial accounting that can be aggregated to any administrative boundary.
4. ¶4 SEEA EA (2021), paras. 3.12–3.18 (EAA and BSU definitions). The ecosystem accounting area (EAA) is “the geographical area for which an ecosystem account is compiled” and the basic spatial unit (BSU) is “the smallest unit of land or water for which information is collected and which can be attributed to a specific ecosystem type.”
5. ¶5 Keith, D.A., et al. (2022), “A function-based typology for Earth’s ecosystems”, *Nature*, 610, 513–518. The IUCN Global Ecosystem Typology provides a hierarchical classification of the world’s ecosystems into realms, biomes, ecosystem functional groups, and biogeographic ecotypes.
6. ¶6 SEEA EA (2021), paras. 3.23–3.25 (hybrid boundary documentation). Ecosystem accounting areas may be defined to suit particular analytical purposes (including hybrid combinations of administrative and ecological criteria) provided the boundaries are clearly documented and consistently applied across accounting periods.
7. ¶7 SEEA EA (2021), paras. 3.19–3.22 (BSU resolution and aggregation). BSUs are designed to support derivation of extent, condition, and ecosystem service flow accounts at the relevant spatial scale, and to support consistent aggregation to any administrative or ecological boundary of interest.
8. ¶8 TG-0.8 (Implementation Readiness Assessment) §3.1.2 uses a four-level maturity scale (Level 1 to Level 4). The three Implementation Levels defined in this §3.1 aggregate TG-0.8 Levels 3 and 4 into a single fine-resolution category, so §3.1 Implementation Level 3 corresponds to TG-0.8 Level 3 or Level 4 readiness. Compilers consulting TG-0.8 directly should map their TG-0.8 score to the §3.1 Implementation Level using this correspondence.
9. ¶9 SNA 2025 paras. 4.10–4.14 (residence principle). The residence principle allocates economic activity to the institutional unit’s centre of economic interest; for sub-national accounts, this is typically the province or region where the enterprise is registered.
10. ¶10 SEEA EA (2021), Chapter 7. Ecosystem service supply is allocated to the ecosystem type providing the service; use is allocated to the economic or household unit benefiting. For global-public-good services, the Rest of World is the use-side beneficiary.
11. ¶11 Eurostat (2013), *European System of Accounts (ESA 2010)*, Chapter 13 on regional accounts. ESA 2010 Chapter 13 sets out the conceptual rule that regional accounts should be consistent with national accounts and compiled using methods that ensure additivity across regions. The detailed balancing procedures referenced here (proportional residual reallocation, RAS) are documented in Eurostat (2013) *Manual on Regional Accounts Methods* (see [12](#)).
12. ¶12 Eurostat (2013), *Manual on Regional Accounts Methods*. Provides the operational regional-accounts balancing procedures (RAS, proportional residual reallocation) and the product-by-region SUT extension referenced in §3.2. Compilers seeking a full product-dimension regional SUT should consult this manual rather than ESA 2010 Chapter 13, which is the conceptual framework only.
13. ¶13 SNA 2025, Chapter 25 (exhaustiveness). The SNA 2025 requires that national accounts capture all productive activity regardless of whether it is recorded in administrative data or official surveys; sub-national disaggregation should preserve this exhaustiveness property.
14. ¶14 SEEA EA (2021), Chapter 4. “Ecosystem extent accounts record the total area of each ecosystem type within an ecosystem accounting area. They are compiled in terms of area (e.g. hectares) and record opening and closing stocks and relevant additions and reductions in ecosystem extent for each ecosystem type.”

5. ¶15 Continental shelf waters extent is recorded at 650 km² in both opening and closing stock. Em-dashes (–) in the change columns indicate that no change-detection entries were generated for the pelagic/shelf water column in this accounting period, as extent-change detection requires bathymetric or oceanographic habitat-mapping data not yet compiled for this province. The two Total rows make the resulting convention explicit: the “Total (mapped ecosystems, excl. shelf)” row sums only the rows with measured change data; the “Total accounting area (incl. shelf)” row preserves the full accounting-area extent under a constant-shelf working assumption. Readers should treat the Net Change figure as conditional on this assumption. See [TG-6.5 Pelagic and Open Ocean Accounts](#) for methods.
6. ¶16 SEEA EA (2021), Chapter 5. “Ecosystem condition accounts record the condition of ecosystem assets in an ecosystem accounting area. They are compiled using a set of indicators, referred to as condition indicators, organized into groups (condition characteristics).” The six condition characteristic groups are: physical state, chemical state, compositional state, structural state, functional state, and landscape and seascape characteristics.
7. ¶17 SEEA EA (2021), paras. 5.60–5.76 (rescaling of condition variables to indicators). The standard rescaling formula is: indicator = (observed – lower reference) / (upper reference – lower reference), bounded to [0, 1]. For negative-direction variables, the formula is applied symmetrically so that higher indicator values always represent better condition.
8. ¶18 Fish species richness in Table 3.11.6 is scoped to coral reef habitat (reef fish assemblage surveys conducted within Marine Park Y reef sites), rather than treated as a pan-ecosystem “all marine” indicator. SEEA EA Chapter 5 organises condition indicators by ecosystem type, and a pan-ecosystem indicator cannot be aggregated coherently with reef-, seagrass-, or mangrove-specific indicators using the area-weighted-mean rule in the interpretation paragraph. Where compilers have data on fish assemblages in additional ecosystem types (e.g., seagrass-associated fish), those should be reported as separate ecosystem-type-scoped indicators.
9. ¶19 DIN condition index rescaled using negative-direction formula: $(20 - 9.1) / (20 - 5) = 10.9 / 15 = 0.73$ (2025); $(20 - 8.2) / (20 - 5) = 11.8 / 15 = 0.79$ (2024). Upper reference VH = 5 ug/L (reference condition); lower reference VL = 20 ug/L (degraded state). Δ Index = $0.73 - 0.79 = -0.06$, encoding worsening condition over the period.
0. ¶20 SEEA EA (2021), para. 13.90. “Much of the information required to compile ocean accounts is common to other communities of practice including those for marine spatial planning, disaster risk and climate change. One objective of the ocean accounting community of practice is to ensure that these common data are standardized and shared.”
1. ¶21 Trend column values in Table 3.11.7 are indicative three-year extrapolations of the 2024–2025 paired observations in Table 3.11.6 (or the 2024–2025 paired extents implied by the closing stock and Net Change column of Table 3.11.5). Operational dashboards should compile trends from at least three accounting periods of the relevant underlying account rather than extrapolating from a single Δ .
2. ¶22 Ecosystem service flow indicators (fish provisioning, coastal protection, blue carbon sequestration) are marked “n/a – not illustrated” because the worked example in this Circular does not compile an upstream physical or monetary ecosystem service flow account; only extent (Table 3.11.5) and condition (Table 3.11.6) accounts are illustrated. In operational compilation, these dashboard cells would be populated from a TG-3.2 ecosystem service flow account compiled for the same Province X Coastal Zone entity. The Rest of World convention for blue carbon (footnote ²³) remains the recommended treatment for the use side of that account when compiled.
3. ¶23 Blue carbon sequestration would, if compiled, illustrate the §3.1 Rest of World convention for global-public-good ecosystem services: physical supply recorded in the Province X Coastal Zone (where mangrove and seagrass ecosystems sequester carbon), but use allocated to the Rest of World column in the sub-national use table because the beneficiary is the global community. This treatment mirrors the SEEA EA Chapter 7 handling of carbon services. The indicator is marked “n/a – not illustrated” in Table 3.11.7 (see ²²) because the upstream flow account is not compiled in this worked example.
4. ¶24 Ocean economy GVA and employment indicators are marked “n/a – not illustrated” because the worked example does not compile an upstream regionalised ocean economy supply-use table for the Province X Coastal Zone; the §3.2 procedure describes the methodology but is not exercised on a numerical example in this Circular.
5. ¶25 Fish catch / sustainable yield cannot be illustrated in this worked example because the upstream Tables 3.11.5 and 3.11.6 do not include a fish stock or maximum sustainable yield estimate for the Province X Coastal Zone. Compilers producing this indicator should derive it from an asset account or stock assessment (see [TG-6.7 Fisheries Stock Assessment](#)) and cite the source MSY estimate.
6. ¶26 Governance (MPA coverage) and social (coastal poverty rate) indicators are marked “n/a – not illustrated” because the worked example does not compile upstream governance (TG-3.7) or social (TG-3.5) accounts for the Province X Coastal Zone.