

Administrative Data Sources

Provides guidance on the use of administrative data sources for the compilation of Ocean Accounts.

Version 0.7.1

Status Draft

Stability Applied

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

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

OUTCOME

This Circular provides guidance on the use of administrative data sources for the compilation of Ocean Accounts. Administrative data (records collected by government agencies and other organisations in the course of their regular operations) are a cost-effective and often wide-ranging source of information for ocean accounting, particularly for maritime activities subject to regulatory oversight. Such data sources include permits and licences for fishing and aquaculture, customs and trade records, vessel registration systems, and vessel tracking data from Automatic Identification Systems (AIS) and Vessel Monitoring Systems (VMS).

Administrative data offer several advantages for ocean accounting programmes: they reduce respondent burden compared to purpose-designed surveys, provide near-complete population coverage for regulated activities, and support temporal and spatial granularity that would be prohibitively expensive to collect through primary data collection. Whilst these advantages are substantial, administrative data also present challenges of coverage, concepts, and quality that must be addressed through systematic quality assurance procedures.

Administrative data and purpose-designed surveys are complementary approaches, not substitutes. Administrative sources perform best where regulatory frameworks produce consistent records (licensed commercial fishing, international trade, and vessel movements). Surveys remain necessary where administrative coverage is incomplete: subsistence and recreational fisheries, informal-sector maritime activities, and emerging ocean economy sectors not yet subject to licensing requirements. A well-designed ocean accounting programme identifies which activities are best captured through administrative sources and where targeted surveys are needed to fill gaps, using the accounting framework itself to detect coverage deficiencies through supply-use confrontation. The methodology for designing such complementary surveys is addressed in [TG-4.2 Survey Methods](#).

Readers of this Circular will gain an understanding of the main types of administrative data relevant to ocean accounting, the institutional arrangements necessary to access such data, methods for integrating administrative records with statistical frameworks, quality assurance procedures to ensure fitness for purpose, and practical workflows for transforming regulatory records into accounting entries. The guidance serves national statistical offices, fisheries management agencies, maritime authorities, and customs administrations seeking to contribute to or compile Ocean Accounts. The foundational concepts of Ocean Accounts are established in [TG-0.1 General Introduction to Ocean Accounts](#), and the governance structures required for multi-agency data collaboration are set out in [TG-0.7 Institutional Arrangements](#).

CONTENTS

1. Outcome 3

2. Requirements 3

3. Guidance Material 4

 3.1 Permits and Licenses 4

 3.2 Customs and Trade Data 8

 3.3 Vessel Tracking (AIS/VMS) 10

 3.4 Administrative Data Compilation Workflow 15

 3.5 Worked Example: Fisheries Licensing Data for Catch Accounts 17

 3.6 Quality Assurance for Administrative Data 20

 3.7 Upward Connections to Account Uses 22

4. Summary 24

5. Acknowledgements 24

Footnotes 24

ABOUT THIS CIRCULAR

RECOMMENDED CITATION

Administrative Data Sources (2026) (GOAP Technical Guidance on Ocean Accounting, TG-4.3, v0.7.1). GOAP Secretariat. <https://guidance.oceanaccounts.org/circulars/section-4/4-3-administrative-data/>

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

DRAFT

¶1 ⓘ Framework Position

¶2 TG-4.3 sits within Section 4 (Data Methods). It owns the administrative source: custodian identification and legal access basis, extraction, deduplication across agencies, cleaning, classification mapping, coverage assessment, and the quality statement that accompanies each variable delivered – catch, licence receipts, customs quantities and values, and vessel register attributes. It does not own the accounts those variables populate. Placing them in the supply and use table, and choosing the price basis for a monetary cell, is **TG-3.3 Economic Activity Relevant to the Ocean**; fleet capital stock and resource rent are **TG-3.1 Asset Accounts** Sections 3.3 and 3.6.

1. Outcome

¶1 This Circular provides guidance on the use of administrative data sources for the compilation of Ocean Accounts. Administrative data (records collected by government agencies and other organisations in the course of their regular operations) are a cost-effective and often wide-ranging source of information for ocean accounting, particularly for maritime activities subject to regulatory oversight¹. Such data sources include permits and licences for fishing and aquaculture, customs and trade records, vessel registration systems, and vessel tracking data from Automatic Identification Systems (AIS) and Vessel Monitoring Systems (VMS).

¶2 Administrative data offer several advantages for ocean accounting programmes: they reduce respondent burden compared to purpose-designed surveys, provide near-complete population coverage for regulated activities, and support temporal and spatial granularity that would be prohibitively expensive to collect through primary data collection². Whilst these advantages are substantial, administrative data also present challenges of coverage, concepts, and quality that must be addressed through systematic quality assurance procedures.

¶3 Administrative data and purpose-designed surveys are complementary approaches, not substitutes. Administrative sources perform best where regulatory frameworks produce consistent records (licensed commercial fishing, international trade, and vessel movements). Surveys remain necessary where administrative coverage is incomplete: subsistence and recreational fisheries, informal-sector maritime activities, and emerging ocean economy sectors not yet subject to licensing requirements. A well-designed ocean accounting programme identifies which activities are best captured through administrative sources and where targeted surveys are needed to fill gaps, using the accounting framework itself to detect coverage deficiencies through supply-use confrontation. The methodology for designing such complementary surveys is addressed in **TG-4.2 Survey Methods**.

¶4 Readers of this Circular will gain an understanding of the main types of administrative data relevant to ocean accounting, the institutional arrangements necessary to access such data, methods for integrating administrative records with statistical frameworks, quality assurance procedures to ensure fitness for purpose, and practical workflows for transforming regulatory records into accounting entries. The guidance serves national statistical offices, fisheries management agencies, maritime authorities, and customs administrations seeking to contribute to or compile Ocean Accounts. The foundational concepts of Ocean Accounts are established in **TG-0.1 General Introduction to Ocean Accounts**, and the governance structures required for multi-agency data collaboration are set out in **TG-0.7 Institutional Arrangements**.

2. Requirements

¶1 This Circular requires familiarity with:

- ¶2

TG-0.1 General Introduction to Ocean Accounts – provides foundational understanding of Ocean Accounts components and the relationship between environmental and economic

accounting frameworks, including the conceptual distinctions between physical and monetary accounts that administrative data must support.

¶3

TG-0.7 Institutional Arrangements – establishes the governance structures, data sharing agreements, and inter-agency coordination mechanisms that are prerequisites for accessing administrative data held by regulatory authorities.

¶4 **Related Circulars:**

- ¶5 **TG-1.5 OA and Fisheries Management** – application of accounts to fisheries policy, including treatment of aquatic resources as environmental assets
- ¶6 **TG-3.3 Economic Activity Relevant to the Ocean** – classification of ocean-related industries and businesses for economic accounts
- ¶7 **TG-3.4 Flows from Economy to Environment** – recording of residuals and pressures using permit data on authorised discharges
- ¶8 **TG-4.2 Survey Methods** (statistical survey methodology for filling gaps in administrative coverage) – design of complementary surveys where administrative coverage is incomplete
- ¶9 **TG-4.1 Remote Sensing and Geospatial Data** (earth observation and remote sensing data for spatial attribution and vessel tracking pattern validation) – independent validation of vessel presence and activity from satellite and aerial imagery
- ¶10 **TG-6.7 Fisheries Accounting** – integration of fisheries license data with stock assessment and catch accounts
- ¶11 **TG-4.6 Data Harmonisation and Interoperability** – OBS_STATUS codelist conventions and SDMX metadata standards applied to administrative data quality flags (see Section 3.4.3)
- ¶12 **TG-6.10 Maritime Transport and Ports** – use of port records and vessel tracking data for maritime accounts

3. Guidance Material

3.1 Permits and Licenses

¶1 Permit and licence data provide basic information on the population of economic units authorised to undertake ocean-related activities. Such administrative systems are maintained by government agencies responsible for regulating access to marine resources and maritime space³. The data captured through these systems support the compilation of economic accounts by identifying the universe of producers, and enable physical flow accounts by providing authorised extraction or emission levels.

¶2 In practice, the terms “permit” and “licence” are used with varying specificity across jurisdictions. Some countries use “licence” for the general authorisation to engage in an activity (such as commercial fishing) and “permit” for specific conditions attached to that authorisation (such as access to a particular zone or species). Other jurisdictions use the terms interchangeably. For ocean accounting purposes, both instruments serve the same function: they generate administrative records that identify economic units, authorised activities, and regulatory conditions. Compilers should document the national terminology and map permit and licence categories to the relevant accounting classifications, so that the scope of administrative data is clearly understood regardless of local naming conventions. This mapping matters in the Pacific Islands context, where regional organisations such as the Pacific Community (SPC) and the Forum Fisheries Agency (FFA) coordinate data across jurisdictions with differing regulatory terminology.

3.1.0 Administrative Data Custodians and Multi-Agency Deduplication

¶1 An **administrative data custodian** is the agency with statutory authority to issue, amend, or revoke the regulatory instrument in question. Most ocean-related activities are subject to oversight by more than one custodian, and compilers must establish a clear record-authority hierarchy before integrating data across registers.

¶2 **Record authority hierarchy by data type:**

Data type	Primary custodian
Production licenses, catch quotas, vessel licenses	Fisheries agency
Environmental discharge permits, coastal zone allocation consents	Environment or coastal zone management ministry
Vessel registration, safety certificates, flag State documentation	Maritime authority

¶3 For multi-agency situations (for example, aquaculture operations holding a production license from the fisheries ministry, a discharge permit from the environment ministry, and a site lease from the coastal zone management authority), the issuing agency for the primary licensed activity takes precedence for record authority, and secondary agencies supply supplementary fields (discharge limits, site coordinates) into the integrated record.

¶4 **Deduplication decision tree:** records describing the same operator across multiple registers are linked using a shared operator identifier (the tax registration number or national business identifier as the primary link key). Where the same activity appears in more than one register, the most recently updated record from the primary custodian takes precedence, with secondary-custodian fields appended where they extend rather than contradict the primary record. The formal multi-agency data-sharing agreement template is set out in **TG-0.7 Institutional Arrangements**.

3.1.1 Fishing Permits and Licenses

¶1 National fisheries authorities typically maintain registers of fishing vessels and operators authorised to harvest aquatic resources within territorial waters and the exclusive economic zone (EEZ). Under the United Nations Convention on the Law of the Sea (UNCLOS), coastal States have sovereign rights to manage living resources within their EEZ, which extends up to 200 nautical miles from baselines⁴. This jurisdictional framework underpins the licensing systems that regulate access to fisheries.

¶2 The treatment of fish and aquatic resources within the SEEA framework is detailed in **TG-6.7 Fisheries Accounting**, which explains how licence data feed into asset accounts for natural aquatic resources. The distinction between capture fisheries (ISIC group 031) and aquaculture (ISIC group 032) is fundamental to both regulatory frameworks and accounting treatment⁵.

¶3 Key data elements captured in fishing license systems typically include:

Data Element	Accounting Application	Related Circular
License holder identification	Links to business registers for economic unit classification	TG-2.5
Vessel characteristics (length, tonnage, engine power)	Measures of fishing capacity and capital stock	TG-3.1
Authorized fishing area	Spatial attribution of catches to marine zones	TG-2.2
Authorized gear types	Classification of fishing methods and environmental pressure	TG-3.3
Target species or quotas	Expected extraction levels for stock accounts	TG-6.7
License fees paid	Government revenue from natural resource access	TG-3.3

Data Element	Accounting Application	Related Circular
Validity period	Temporal scope of authorized activity	–

¶4 **Live-weight conversion of quota data.** Quota volumes must be converted to live-weight equivalent using the source hierarchy described in Section 3.2.1. For Pacific tuna quotas issued under FFA Vessel Day Scheme (VDS) arrangements (recorded as fishing days rather than tonnage), apply the FFA-published species-specific catch-per-vessel-day coefficients (updated annually by FFA/SPC) to convert vessel-day quotas to live-weight equivalent tonnes.⁶

¶5 For countries with quota-based fisheries management, license data include allocated catch limits that can be compared against reported landings to assess compliance and sustainable yield. Where individual transferable quotas (ITQs) exist, records of quota trades provide additional information on the economic value of access rights⁷. This valuation information is relevant to the compilation of monetary asset accounts as discussed in **TG-3.1 Asset Accounts**.

¶6 A common challenge in using licence databases for accounting purposes is the presence of inactive records (vessels that remain on the register but are no longer operational). Licence registers may include vessels that have been decommissioned, sold outside the jurisdiction, or have simply ceased fishing activity without formally surrendering their licence. For accounting purposes, compilers should distinguish between the 'registered' fleet (all current licence holders) and the 'active' fleet (vessels that reported activity during the accounting period). That distinction can be established by cross-referencing licence registers with landing declarations, vessel tracking data, or annual renewal records.

¶7 **Materiality threshold for inactive vessels.** An inactive-vessel share exceeding **10% of the registered fleet** triggers a register audit conducted jointly with the fisheries management agency, with results documented in the source register maintained under Section 3.7. Inactive vessels are retained in capital stock accounts as idle capacity, flagged with an "inactive" status attribute in the vessel register extract, consistent with SNA 2025 para. 20.14 on the treatment of idle fixed assets⁸. They are not excluded from the fleet capital stock but are reported separately in a memorandum row to enable over-capacity assessment. See **TG-3.1 Asset Accounts** for the capital stock recording conventions.

¶8 **Decision use cases for fishing license data:**

1. ¶9

Stock assessment calibration – Licence records establish the upper bound of fishing capacity. Fisheries scientists use that bound to calibrate effort estimates and to detect unreported fishing where observed catches exceed licensed capacity.

2. ¶10

Economic activity measurement – Licence fee revenues and vessel characteristics feed directly into supply-use tables for the fishing industry, supporting measurement of government revenue from natural resource access and the capital stock of fishing enterprises.

3. ¶11

Spatial attribution – Authorised fishing areas in licence records enable attribution of catches to specific marine zones for spatially disaggregated asset accounts. Such attribution matters for countries with large EEZs where different zones support different fisheries.

3.1.2 Aquaculture Licenses

¶1 Aquaculture operations (the farming of aquatic organisms including fish, molluscs, crustaceans and aquatic plants) are typically subject to environmental permits that authorise the location, scale, and species cultivated⁹. These permits capture information essential for compiling asset accounts for cultivated biological resources.

¶2 Administrative records for aquaculture commonly include:

- ¶3 Site location and authorised production area (hectares or volume)
- ¶4 Species authorised for cultivation
- ¶5 Production capacity (tonnes per annum)
- ¶6 Environmental conditions and discharge limits
- ¶7 Biosecurity requirements
- ¶8 Ownership and corporate structure

¶9 Aquaculture licensing data support both physical and monetary accounts. Production capacity figures provide the basis for estimating potential output, whilst environmental discharge limits enable recording of flows from economy to environment, including nutrient loads and organic wastes¹⁰. The methodology for recording such flows is addressed in **TG-3.4 Flows from Economy to Environment**.

¶10 Integrated multi-trophic aquaculture (IMTA) systems present a specific accounting consideration. In IMTA operations, waste outputs from one cultured species (for example, nutrient-rich effluent from finfish cages) serve as inputs for another species (such as seaweed or filter-feeding shellfish). The net discharge to the marine environment is reduced by the amount absorbed by the co-cultured species, and permits for IMTA operations may specify both gross discharge limits and expected uptake by extractive species.

¶11 **Recording IMTA flows – net entry with mandatory gross memorandum.** The net recording approach for IMTA internal nutrient transfers is a practical approximation permissible where permit data explicitly cover internal recycling flows. Whilst that approximation is accepted, SEEA CF physical flow accounts are gross by design to preserve the supply-use identity¹¹, and gross flows must therefore also be recorded as a memorandum item alongside the net entry. The following two-row recording convention applies:

Row	Entry type	Description
1	Primary – residual flow account	Net discharge to the marine environment after subtracting nutrient absorption by co-cultured extractive species
2	Memorandum – gross flows	(a) Gross finfish-cage discharge; (b) gross nutrient absorption by co-cultured filter-feeders / seaweed, with a reconciliation note confirming Row 1 = (a) – (b)

¶12 IMTA recording is flagged as a known area where national practice may deviate from the SEEA CF gross-recording standard, and the deviation must be documented in account metadata. See **TG-3.4 Flows from Economy to Environment** for the authoritative SEEA CF residual flow recording convention.

¶13 **Decision use cases for aquaculture license data:**

1. ¶14

Nutrient loading estimates – Permit discharge limits combined with production data enable estimation of nutrient contributions to coastal eutrophication. Those estimates populate water quality accounts and SDG indicator 14.1.1 on coastal eutrophication.

2. ¶15

Production monitoring – Licensed production capacity provides a benchmark against which reported output can be assessed. Systematic under-reporting indicates either data quality issues or informal sector activity requiring supplementary surveys.

3. ¶16

Coastal zone planning – Spatial distribution of aquaculture licenses informs marine spatial planning by identifying areas of intensive use and potential conflicts with other activities.

3.1.3 Offshore Activity Permits

¶1 Maritime jurisdictions regulate offshore activities beyond fishing. Table 3.1.3 below summarises the main permit categories and their accounting relevance.

Permit category	Description
Hydrocarbon exploration and production licenses	Petroleum and natural gas extraction in territorial waters and on the continental shelf is subject to licensing regimes that specify exploration blocks, production sharing arrangements, and environmental management conditions; relevant to mineral and energy resource accounts. ¹²
Renewable energy permits	Offshore wind farms, wave energy installations, and tidal power facilities require permits that specify location, capacity, and environmental mitigation measures; these emerging activities represent growing components of the ocean economy.
Marine mining permits	Extraction of aggregates (sand and gravel), mineral sands, and deep-sea minerals is regulated through permits that specify extraction volumes and areas.
Dumping permits	Disposal of waste materials at sea, including dredge spoil, is regulated under international conventions (the London Convention and Protocol) implemented through national permit systems; permit data on authorised dumping volumes are relevant to TG-3.4 Flows from Economy to Environment . ¹³
Marine scientific research authorisations	Research activities in the EEZ by foreign vessels require authorisation from the coastal State under UNCLOS Article 246. ¹⁴

¶2 **Deep-sea mineral permits – two-category treatment.** Deep-sea mining of polymetallic nodules, seafloor massive sulphides, and cobalt-rich crusts is an emerging category requiring a clear accounting-boundary rule:

- ¶3 **Category A – National jurisdiction.** Permits issued by the national authority for extraction within the territorial sea, EEZ, or on the continental shelf are recorded in national mineral asset accounts under SEEA CF paras. 5.19–5.22¹⁵.
- ¶4 **Category B – The Area (ISA contracts).** Exploration and exploitation contracts issued by the International Seabed Authority for extraction in the Area under UNCLOS Part XI fall outside the national accounting boundary and are excluded from national mineral asset accounts. Where the country is an ISA contractor-sponsoring state (currently including Nauru, Tonga, Kiribati, and Cook Islands), the ISA contract data may be noted as supplementary information in a memorandum table.

¶5 **Decision use cases for offshore permits:**

1. ¶6

Residual flow accounting – Dumping permits specify authorised disposal volumes, and those volumes give a direct measurement of waste flows to the marine environment that populate residual flow accounts under SEEA CF.

2. ¶7

Capital formation – Offshore energy permits track investment in marine renewable energy infrastructure. That investment feeds capital formation accounts for the ocean economy.

3. ¶8

Environmental pressure indicators – Aggregation of permit data across offshore activities enables compilation of spatial pressure maps showing cumulative impacts on marine ecosystems.

3.2 Customs and Trade Data

¶1 Customs administrations generate detailed data on international trade in goods, including seafood products, maritime equipment, and other ocean-related commodities. These data are essential for compiling supply and use tables, physical flow accounts for traded products, and balance of payments statistics¹⁶.

3.2.1 Seafood Trade Statistics

¶1 Customs records for fish and fishery products provide detailed information on:

- ¶2 Product classification (Harmonized System codes at 6-digit or national tariff line detail)
- ¶3 Volume (tonnes) and value (FOB/CIF)
- ¶4 Country of origin/destination
- ¶5 Port of entry/exit
- ¶6 Importer/exporter identification

¶7 The SEEA AFF recommends that physical flow accounts for fish products record imports and exports in live weight equivalent to ensure consistency with domestic production statistics¹⁷. Conversion factors must be applied to transform processed product weights (fillets, frozen, canned) to the comparable live weight measure.

¶8 **Live-weight conversion factor source hierarchy.** The choice of conversion factor materially affects total live-weight equivalent trade volumes and the supply-use balance, particularly for seafood-exporting countries. Compilers should apply the following three-step adaptation protocol:

1. ¶9 **Primary – FAO Fisheries and Aquaculture Department live-weight conversion factor database** (FAO 1994, updated). Search the database for the exact species (FAO ASFIS alpha-3 code) and processing form (whole, gutted, fillets, canned, etc.).
2. ¶10 **Secondary – ICES Working Group on Fisheries Acoustics, Science and Technology (WGFAST) technical report series**, used for processed and value-added products not adequately covered by FAO factors. National fisheries institute conversion factors may also be applied at this tier, provided the source name and vintage year are recorded in the source register (Section 3.7).
3. ¶11 **Default – nearest taxonomic group factor** from the FAO database, applied where neither a species-specific FAO factor nor a national factor is available. Estimates produced at this tier must be flagged as **provisional** in account metadata.

¶12 **Worked example.** A national customs system records 1,000 tonnes (net product weight) of canned skipjack tuna exports. Applying the FAO factor of 1.9 for canned tuna (drained-weight basis), the live-weight equivalent for the physical export account is **1,000 × 1.9 = 1,900 tonnes**.

¶13 This conversion workflow is consistent with the parallel live-weight conversion of quota data described in Section 3.1.1. Both pathways must apply the same factor source for a given species and processing form to preserve supply-use consistency.

¶14 For island nations and coastal States where fisheries are economically significant, customs data serve multiple accounting purposes:

¶15 **Supply-use balancing** – Exports and imports provide the external trade components necessary to balance domestic production against consumption and intermediate use¹⁸. The integration of trade data with production data is discussed in **TG-6.7 Fisheries Accounting**.

¶16 **Trade in fish caught by foreign vessels** – When foreign-flagged vessels harvest fish in a country's EEZ under access agreements, the transshipment or landing of catches may be recorded in customs statistics, supporting the distinction between catches from national waters and catches by national fishing vessels¹⁹. This distinction matters for Pacific Island Countries where distant-water fishing nations operate under access agreements.

¶17 For Pacific Island Countries, reconciliation between national customs records and regional databases maintained by the Forum Fisheries Agency (FFA) requires systematic attention. FFA compiles catch and effort data reported under regional fisheries management arrangements, which may differ from national customs records through differences in timing (landing date versus export date), valuation (access fees versus market price), and coverage (transshipments at sea versus port

landings). Compilers should establish regular data confrontation between customs and FFA sources, and should document the reconciliation procedures and any systematic differences. The FFA's Regional Fisheries Surveillance Centre also maintains vessel day scheme data that can cross-validate customs records for purse seine fisheries. Institutional arrangements for accessing FFA data are facilitated through national fisheries agencies and should be formalised under the frameworks described in **TG-0.7 Institutional Arrangements**.

¶18 **Illegal, unreported and unregulated (IUU) fishing indicators** – Comparison of import volumes with reported exports from origin countries can reveal discrepancies indicative of unreported catches or trade in IUU-sourced products²⁰. SDG indicator 14.6.1 tracks progress in combating IUU fishing, which can be supported by trade data analysis.

¶19 **Decision use cases for customs trade data:**

1. ¶20

Supply-use balancing – Customs data provide the import and export components of seafood supply-use tables. Discrepancies that emerge in balancing may indicate unreported production or consumption.

2. ¶21

IUU fishing detection – Trade flow analysis comparing bilateral import-export data identifies anomalies consistent with illegal fishing, which supports SDG 14.6.1 monitoring.

3. ¶22

Value chain analysis – Product-level trade data reveal the structure of seafood value chains, including which species are exported fresh and which are processed domestically. That structure informs industrial development policy.

3.2.2 Maritime Equipment and Inputs

¶1 Customs data also capture trade in goods used as inputs to ocean industries:

- ¶2 Fishing vessels and parts (relevant to capital formation accounts)
- ¶3 Marine engines and propulsion equipment
- ¶4 Fishing gear (nets, lines, traps)
- ¶5 Aquaculture equipment (cages, feeders, aeration systems)
- ¶6 Fuel and lubricants (with marine-specific customs categories)
- ¶7 Ice and refrigeration equipment

¶8 These data support the compilation of intermediate consumption and capital formation components of ocean economy supply-use accounts.

3.2.3 Port Statistics and Maritime Transport

¶1 Port authorities and customs administrations generate data on vessel movements and cargo throughput that are central to measuring maritime transport activity:

- ¶2 Vessel arrivals and departures by flag state, vessel type, and tonnage
- ¶3 Cargo handled (tonnes, container TEUs, passengers)
- ¶4 Port service revenues

¶5 These data feed into both national accounts (transport sector output) and physical flow accounts (material throughput through maritime logistics). Detailed guidance on compiling maritime transport accounts is provided in **TG-6.10 Maritime Transport and Ports**.

3.3 Vessel Tracking (AIS/VMS)

¶1 Vessel tracking systems provide spatially explicit data on maritime activity that improve the attribution of economic activity and environmental pressures to specific marine locations. Two pri-

mary systems are relevant. All inter-agency data sharing agreements required by this section should be established under the framework in **TG-0.7 Institutional Arrangements**.

3.3.1 Automatic Identification System (AIS)

¶1 The Automatic Identification System is an automatic tracking system mandated by the International Maritime Organization (IMO) for vessels engaged in international voyages and for all passenger vessels, cargo vessels of 300 gross tonnage and above, and fishing vessels above certain size thresholds (varying by jurisdiction)²¹. AIS transponders broadcast vessel identity, position, course, and speed at regular intervals.

¶2 Key data elements from AIS include:

Data Field	Description
MMSI	Maritime Mobile Service Identity
Position (lat/lon)	GPS-derived location
Speed over ground	Vessel velocity
Course over ground	Direction of travel
Vessel type	Classification code
Destination	Reported port
Timestamp	Date and time

¶3 AIS data are now widely available through satellite reception and coastal base stations, and they enable:

¶4 **Fishing effort estimation** – Analysis of vessel tracks can identify fishing behaviour from speed and movement patterns, which yields estimates of fishing effort by area that complement or substitute for vessel logbook data²². This spatial effort data supports the compilation of catch accounts by marine zone.

¶5 **Spatial attribution** – Catches can be attributed to specific marine zones (territorial sea, EEZ zones, high seas) based on vessel positions during fishing activity, supporting spatially explicit asset accounts. This aligns with the spatial framework described in **TG-2.2 Macro-economic Dependencies on Ocean Ecosystems**.

¶6 **Fleet characterisation** – Analysis of active vessel populations, activity levels, and spatial patterns provides information on the structure of fishing industries beyond what license registers capture²³.

¶7 **Environmental pressure mapping** – Combining vessel activity data with emission factors enables spatial mapping of pressures from shipping emissions, underwater noise, and collision risk with marine mammals. These pressure indicators feed into **TG-3.4 Flows from Economy to Environment**.

¶8 A material limitation of AIS data is gaps caused by vessels that disable their transponders (so-called 'dark' vessels) or operate in areas with limited satellite or terrestrial receiver coverage. AIS gaps may be intentional (vessels seeking to conceal unauthorised fishing activity) or unintentional (equipment failure, signal interference, or gaps in satellite coverage in remote ocean areas).

¶9 **Tiered AIS gap decision framework**. Compilers should apply the following tiered method, choosing the tier based on the duration and pattern of the observed gap:

Tier	Gap duration	Method
(a)	Under 24 hours	Linear position interpolation between the last and next valid AIS fix; interpolated positions are recorded with a provisional flag.

Tier	Gap duration	Method
(b)	1–7 days	Statistical estimation using the ratio of observed vessel-days to expected vessel-days. Expected coverage is derived from a satellite AIS coverage model – the Copernicus Marine Service AIS density product or the Global Fishing Watch coverage layer. The expected coverage rate is documented in account metadata.
(c)	Over 7 days, or any duration where dark behaviour is suspected (vessel stationary or anomalous speed change immediately preceding the gap)	Cross-reference VMS if available under the access hierarchy in Section 3.3.2; otherwise flag the vessel-period as missing data with OBS_STATUS = "M".

¶10 **Materiality threshold.** Where gap-adjusted fishing effort exceeds **3% of unadjusted total effort**, a mandatory quality note must accompany the published account.

¶11 **Worked example.** A purse-seiner experiences a 5-day AIS gap in a zone with documented 70% expected satellite coverage. Tier (b) statistical estimation yields:

$$\text{adjusted vessel-days} = \text{AIS-observed vessel-days} / 0.70$$

¶12 where "AIS-observed vessel-days" is the count of days with valid AIS position fixes received within the reference zone during the gap-adjusted period.

¶13 A $\pm 15\%$ uncertainty range is documented in metadata to reflect typical variance in satellite-AIS coverage models.

¶14 Independent validation of vessel presence in areas with suspected AIS gaps can be obtained from remote sensing data. See **TG-4.1 Remote Sensing and Geospatial Data** for earth observation methods supporting AIS validation.

3.3.2 Vessel Monitoring System (VMS)

¶1 Vessel Monitoring Systems are fisheries-specific tracking systems required by many fisheries management authorities for licensed fishing vessels. Unlike AIS, VMS data are typically transmitted only to fisheries management agencies and are not publicly available. VMS systems often require more frequent position reporting than AIS (commonly every 1–2 hours, or more frequently during fishing activity).

¶2 VMS data provide fisheries managers with:

- ¶3 Verification that vessels are operating in authorised zones
- ¶4 Records of fishing effort by location for quota management
- ¶5 Evidence for enforcement actions against zone violations

¶6 For ocean accounting purposes, VMS data (where accessible under data sharing arrangements) provide higher-quality information on fishing vessel activity than AIS, particularly for smaller vessels not subject to AIS carriage requirements²⁴.

¶7 **VMS access fallback hierarchy.** In many jurisdictions VMS data are classified as law-enforcement sensitive and fisheries agencies are legally constrained in sharing them with statistical offices. Compilers should pursue the following access hierarchy:

1. ¶8 **Individual vessel VMS microdata under inter-agency data sharing agreement** – preferred.
2. ¶9 **Aggregated VMS effort grids** from the fisheries agency – accepted for spatial attribution accounts (zone-level effort totals) but not for individual vessel effort analysis or capital stock accounts.

3. ¶10 **AIS-only compilation** with documented VMS non-availability, including a stated uncertainty range on effort estimates recorded in account metadata.

¶11 **Model confidentiality clause for VMS data sharing agreements.** The following clause is recommended for insertion into inter-agency agreements:

VMS data transferred to the [national statistical office] shall be: used exclusively for statistical compilation purposes; stored in a secure, access-controlled environment; not disclosed at the individual vessel level in any published account output; and subject to the same statistical confidentiality provisions as individual tax records.

3.3.3 Integration with Other Data Sources

¶1 The value of vessel tracking data for ocean accounting is maximised when integrated with other administrative and statistical sources:

- ¶2 **Vessel registers** link tracking data to vessel characteristics, ownership, and license conditions
- ¶3 **Landing declarations** link fishing activity locations to catch species and volumes
- ¶4 **Customs data** complete the picture of international trade flows
- ¶5 **Business registers** enable classification of vessel operators within standard industry classifications

¶6 Such integration requires unique vessel identifiers (IMO number, national registration number, MMSI) that are consistently applied across data sources. The development of a unified vessel identifier system is recommended as part of the institutional arrangements for ocean accounting.

¶7 **Small vessel identification (sub-IMO fleet).** The IMO ship identification number scheme covers vessels of 100 gross tonnage and above in international service, and the voluntary IMO fishing vessel numbering scheme covers vessels above certain thresholds. The bulk of artisanal and small-scale fishing vessels (typically under 12 m length overall or under 100 GT) fall outside both schemes. For these vessels:

- ¶8 **National vessel register numbers** serve as the primary identifier where IMO numbers are absent. NSOs should work with fisheries agencies to assign permanent unique identifiers to all licensed vessels during register digitisation. The FAO Vessel Identification and Automated Sequencing (VIAS) scheme is recommended as a proven model for national identifier assignment.
- ¶9 **AIS-based linking is not feasible** for sub-12 m vessels (which are not legally required to carry AIS transponders). VMS matching (where available under the access hierarchy in Section 3.3.2) or **landing declaration matching** (vessel name + departure port + departure date) must serve as the primary integration mechanism for small-scale fleets.
- ¶10 **Unmatched small-vessel landing records** should be aggregated to species-zone-period totals rather than discarded, preserving total catch coverage in SEEA AFF physical flow accounts.

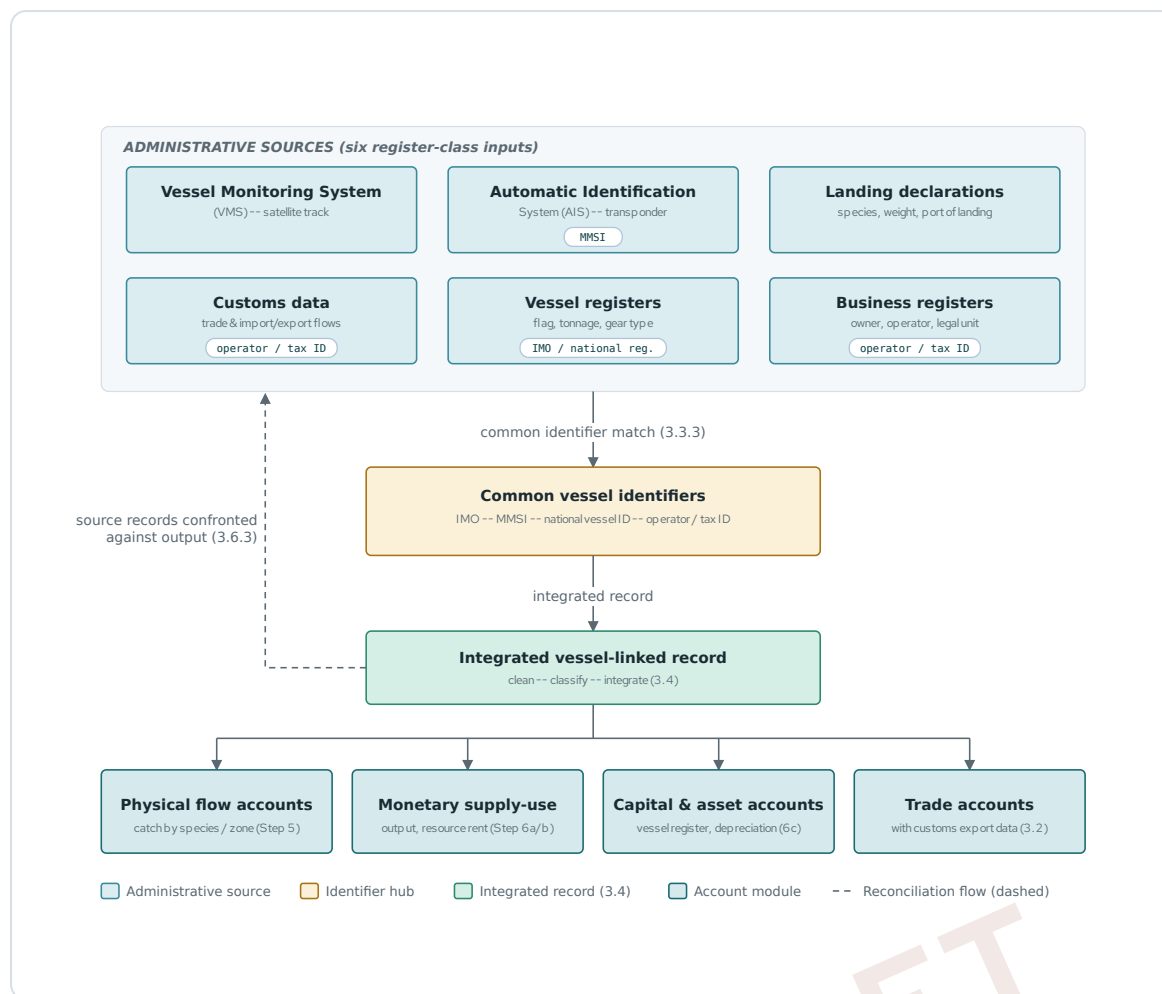


Figure 4.3.1 Six administrative sources resolve through a common-identifier hub into four vessel-linked ocean-account modules. Sources include VMS, AIS, landings, customs, and registers. Dashed reconciliation confronts sources against outputs.

Source: TG-4.3, Sections 3.3.3 (linkage keys), 3.4 (compilation workflow), 3.5 (worked example, Steps 5--6), 3.6.3 (data confrontation); UN GSBPM v5.1 Phases 4--5 (Process and Analyse); OECD Quality Framework for Statistical Activities (data integration principles).

¶11 Figure 4.3.1 traces the full integration pathway. Each of the six administrative sources carries a different linkage key. AIS broadcasts an MMSI, vessel registers record the IMO or national registration number, and customs and business registers are keyed to the operator's tax or business identifier rather than to the vessel itself (Section 3.1.0), so a common-identifier match is required before records can be combined. The matched records resolve into a single integrated vessel-linked record, which is then cleaned, classified, and integrated through the compilation workflow set out in Section 3.4. That enriched record carries catch, capacity, ownership, and price fields alongside the identifiers used to build it, and it yields the four variable sets set out in the worked example in Section 3.5: catch by species and zone (Step 5), ex-vessel prices and licence fee receipts (Steps 6(a)–(b)), vessel register attributes (Step 6(c)), and trade quantities and values, the last of these when combined with customs export data (Section 3.2). Each is delivered to the account that uses it rather than tabulated here. The dashed return flow denotes the data confrontation step (Section 3.6.3), in which source records such as landing declarations are reconciled against the integrated outputs. The broader set of account components that administrative data support beyond this vessel-identifier pathway is mapped in Section 3.7.

¶12 Decision use cases for vessel tracking data:

1. ¶13

Effort-based catch estimation – For data-poor stocks lacking complete landing records, AIS/VMS-derived fishing effort by zone can be combined with catch-per-unit-effort estimates to produce spatially disaggregated catch estimates.

2. ¶14

MPA compliance monitoring – Vessel tracking data enable detection of incursions into marine protected areas. These incursion records feed ecosystem condition accounts that quantify fishing pressure in protected zones.

3. ¶15

Emissions attribution – Combining vessel tracks with engine characteristics and speed-dependent emission factors enables spatial attribution of shipping emissions to coastal zones and high-traffic areas.

3.4 Administrative Data Compilation Workflow

¶1 Transforming administrative records from their source format into account-ready data requires systematic procedures. This section presents a general compilation workflow applicable across different administrative sources²⁵.

3.4.1 Pre-compilation Assessment

¶1 Before initiating compilation, compilers should assess:

¶2 **Data availability** – Which administrative systems exist, which agencies hold the data, and under what legal authority can the data be accessed. A systematic inventory of administrative sources relevant to ocean accounting should be prepared as part of the institutional arrangements described in **TG-0.7 Institutional Arrangements**.

¶3 **Data scope and coverage** – What population of economic units or activities is covered by the administrative system, and what known gaps exist. For example, a fishing license register covers commercial fishing but typically excludes subsistence fishing and recreational fishing.

¶4 **Update frequency and timeliness** – How often are administrative records updated, and what lag exists between the reference period and data availability. Port statistics may be available monthly with a 2-month lag, whilst annual fishing license renewals provide data only once per year.

¶5 **Data format and structure** – Whether data are available in machine-readable formats (databases, spreadsheets) or only as paper records or PDFs requiring manual extraction.

3.4.2 Data Access and Extraction

¶1 The framework for formal data sharing agreements is set out in **TG-4.7 National Data Coordination Architectures** Section 3.2, covering scope, frequency, quality standards, confidentiality regimes (statistical confidentiality, commercial sensitivity, and personal data protection), exchange formats, and dispute resolution. That guidance applies directly to agreements with fisheries departments, customs administrations, and port authorities.

¶2 Once data sharing arrangements are established, extraction procedures should be documented: database queries or API calls used to extract records, file naming and versioning conventions, storage locations and backup procedures, and any manual interventions required.

3.4.3 Data Cleaning and Validation

¶1 General data cleaning and validation procedures follow the classify-map-validate-integrate workflow in **TG-4.6 Data Harmonisation and Interoperability** Section 3.5 (Phase 3: Validate), covering missing values, inconsistent formats, duplicate records, out-of-scope records, and implausible values. The documentation requirements for quality assurance procedures (automated rules, manual review protocols, imputation decisions, and adjustments) are set out in **TG-0.7 Quality Assurance Principles**.

¶2 **Critical fields and imputation rules – administrative data.** For ocean accounting, “critical fields” are defined as: vessel identifier, catch volume (tonnes), catch species (FAO ASFIS alpha-3 code), fishing zone code, and reporting period (year or quarter). Imputation is acceptable for critical fields only where record-level missingness does not exceed **5% of records within a species-zone-period cell**. Above this threshold the data source is rated as not fit for direct compilation, and supplementary estimation methods (e.g., sample survey expansion) must be applied instead. The default imputation method is **nearest-neighbour hot-deck imputation**, with donor pools defined by matching on vessel class, season, and fishing zone, the three variables most predictive of catch composition. All imputed values in account output tables must carry an OBS_STATUS attribute of “E” (estimated), consistent with the SDMX OBS_STATUS codelist and the conventions of TG-4.6.

3.4.4 Classification Mapping

¶1 The concordance development process (structural comparison, conceptual alignment, mapping relationships, documentation, and validation) and the management of temporal concordances across ISIC and CPC revisions are covered in **TG-4.6 Data Harmonisation and Interoperability** Section 3.4. The following example illustrates the application of that concordance process to fisheries administrative categories.

¶2 Example: Fishing license type to ISIC mapping

License Type (Administrative)	ISIC Rev.4	ISIC Description
Commercial fishing license	0311	Marine fishing
Coastal fishing license	0311	Marine fishing
Aquaculture license – finfish	0321	Marine aquaculture
Aquaculture license – shellfish	0321	Marine aquaculture
Recreational fishing permit	(Not in ISIC – household production)	–

3.4.5 Preparing Records for Delivery

¶1 Once administrative data are cleaned and classified, they are prepared for delivery to the compiling circular. Preparation procedures include:

¶2 **Business register matching** – Linking licence holders or permit applicants to business register entries using business identifiers (tax numbers, registration numbers). Matching on a shared business identifier enables consistent industry classification and aggregation with other business statistics.

¶3 **Temporal alignment** – Aligning administrative reference periods (license validity periods, customs clearance dates) with accounting periods (typically calendar years).

¶4 **Unit conversion** – Converting administrative units (license counts, permit capacities) to accounting units (number of enterprises, production volumes, capital stock values).

¶5 **Aggregation and tabulation** – Aggregating individual administrative records to the reporting level the account requires (industry totals, product categories, geographic zones), so that the variable is delivered at the granularity the account table expects. Placing the aggregates into account rows, and any balancing that follows, is done in the compiling circular – **TG-3.3 Economic Activity Relevant to the Ocean** for ocean industry flows, **TG-3.1 Asset Accounts** for asset entries.

3.4.6 Compilation Documentation

¶1 Compilation documentation requirements follow the general quality documentation framework in **TG-0.7 Quality Assurance Principles** and the metadata standards in **TG-4.6 Data Harmonisation and Interoperability** Section 3.6, covering data sources, cleaning procedures, classification mappings, assumptions, known limitations, and comparisons with previous rounds.

The source register template in Section 3.7.1 below provides the administrative-data-specific documentation format for recording custodian details, legal access basis, and quality ratings for each administrative source.

3.5 Worked Example: Fisheries Licensing Data for Catch Accounts

¶1 This section presents a synthetic worked example illustrating how fishing license data can be integrated with catch reporting data to populate physical flow accounts for capture fisheries, and how the same administrative data are extended to populate monetary production accounts. The example demonstrates the complete workflow from administrative records to account entries.

Context

¶1 The national fisheries authority maintains a database of commercial fishing licenses. Each license record includes vessel identification, authorised fishing areas, target species, and gear types. Vessel operators are required to submit monthly catch reports specifying species caught, volumes, and fishing locations. The national statistical office seeks to compile annual physical flow accounts for capture fisheries showing catch by species and marine zone, and to extend these into monetary supply-use entries.

Step 1: Data Access

¶1 A formal data sharing agreement is established between the statistical office and fisheries authority, specifying quarterly transfer of:

- ¶2 License register extract (all active licenses for the accounting year)
- ¶3 Catch reports database (all submitted reports for the accounting year)
- ¶4 Vessel register (vessel characteristics for all licensed vessels)

¶5 Data are transferred as CSV files via secure file transfer protocol.

Step 2: Data Extraction

¶1 **License register extract** (sample records):

License_ID	Vessel_ID	Operator_Name	Valid_From	Valid_To	Zone_Code	Species
LIC-2023-0147	VES-0893	Blue Seas Fishing Ltd	2023-01-01	2023-12-31	EEZ-NORTH	TUN
LIC-2023-0148	VES-0722	Ocean Harvest Co	2023-01-01	2023-12-31	EEZ-SOUTH	SNA,GRO
LIC-2023-0149	VES-1054	Coastal Catch Ltd	2023-01-01	2023-12-31	TS-WEST	MUL

¶2 **Catch reports database** (sample records):

Report_ID	Vessel_ID	Report_Month	Species_Code	Catch_Tonnes	Zone_Code	
CR-2023-01-0147	VES-0893	2023-01	TUN	12.4	EEZ-NORTH	
CR-2023-02-0147	VES-0893	2023-02	TUN	8.7	EEZ-NORTH	
CR-2023-01-0148	VES-0722	2023-01	SNA	3.2	EEZ-SOUTH	
CR-2023-01-0148	VES-0722	2023-01	GRO	1.8	EEZ-SOUTH	

Step 3: Data Cleaning and Validation

¶1 **Check 1: Coverage completeness**

Licensed vessels with no catch reports: 12 vessels (8% of register)
Catch reports from unlicensed vessels: 0 (good)

¶2 Interpretation: 12 vessels licensed but not reporting catches may be inactive or non-compliant. Flag for follow-up with fisheries authority.

¶3 Check 2: Spatial compliance

Catch reports from zones outside licensed areas: 3 reports (0.5% of total)

¶4 Interpretation: Small number of zone violations detected. These catches are included in accounts but flagged for enforcement follow-up.

¶5 Check 3: Temporal alignment

Late reports (submitted >60 days after reference month): 47 reports (8% of total)

¶6 Interpretation: Most reports submitted on time. Late reports are included in annual accounts but noted for quality documentation.

¶7 Check 4: Plausibility

Reports with catch > vessel hold capacity: 2 reports
Reports with implausible coordinates: 5 reports

¶8 Interpretation: 7 reports flagged for manual review. After consultation with fisheries authority, 5 corrected, 2 excluded as data errors.

Step 4: Classification Mapping

¶1 **Species code to ISSCAAP mapping** (International Standard Statistical Classification of Aquatic Animals and Plants):

Fisheries Authority Code	ISSCAAP Code	Common Name	Scientific Name
TUN	36	Tuna	Thunnus spp.
SNA	33	Snapper	Lutjanus spp.
GRO	33	Grouper	Epinephelus spp.
MUL	34	Mullet	Mugil spp.

¶2 **Zone code to marine spatial unit mapping:**

Fisheries Authority Zone	Marine Spatial Unit	Area (km²)
EEZ-NORTH	EEZ Zone 1 (Northern)	425,000
EEZ-SOUTH	EEZ Zone 2 (Southern)	380,000
TS-WEST	Territorial Sea (West)	12,000

Step 5: Delivering the Physical Catch Variable

¶1 **Aggregation of catch reports to annual totals:**

Species_Code	Zone_Code	Total_Catch_Tonnes
TUN	EEZ-NORTH	1,247
SNA	EEZ-SOUTH	382
GRO	EEZ-SOUTH	198

Species_Code	Zone_Code	Total_Catch_Tonnes
MUL	TS-WEST	456

¶2 **Link to business register for industry classification:**

¶3 Using Vessel_ID → Operator_Name → Business_Register_ID matching:

- ¶4 138 licensed vessels matched to 47 fishing enterprises
- ¶5 12 vessels with no catch reports correspond to 8 enterprises (likely inactive)
- ¶6 All enterprises classified as ISIC 0311 (Marine fishing)

¶7 **Variable delivered:**

Industry (ISIC)	Product (ISSCAAP)	Spatial Unit	Catch (tonnes)
0311 Marine fishing	36 Tuna	EEZ Zone 1	1,247
0311 Marine fishing	33 Snapper/Grouper	EEZ Zone 2	580
0311 Marine fishing	34 Mullet	Territorial Sea (West)	456
Total catch			2,283

¶8 Catch is delivered by industry, product and spatial unit, with the coverage and quality statement from Step 7. Entering it in the physical supply and use table is done in **TG-3.3 Economic Activity Relevant to the Ocean**; the corresponding stock entries are in **TG-3.1 Asset Accounts** Section 3.4.1.

Step 6: Delivering the Monetary and Capital Variables

¶1 The same administrative records yield three further variables. This Circular is responsible for extracting them, documenting their coverage and stating their basis; the valuation conventions that turn them into monetary account entries are applied in the compiling circular.

¶2 **(a) Ex-vessel prices.** Fish market transaction records (or, where unavailable, fisheries agency price surveys) give an observed ex-vessel price per species-zone cell – for the worked example, USD 3,400 per tonne for tuna. Deliver the price with its source, reference period, and whether it is inclusive or exclusive of taxes on products, so that the account can place it on the required price basis. Valuing output is **TG-3.3 Economic Activity Relevant to the Ocean**, which applies the SNA basic-price convention.²⁶

¶3 **(b) Licence fee receipts.** Annual licence fee receipts are read directly from the fisheries agency revenue system and delivered as a government receipt series, identified by the access right they are charged for. Whether they are recorded as rent on a natural asset or as a tax on production is an accounting classification, taken in **TG-3.3** for the transaction and in **TG-3.1 Asset Accounts** Section 3.3 where they inform resource rent.

¶4 **(c) Vessel register attributes.** Gross registered tonnage, vessel age and service status are extracted per vessel. Inactive vessels identified under the 10% threshold in Section 3.1.1 are flagged rather than removed, so the account can decide their treatment. Applying a depreciation profile to derive written-down capital stock is **TG-3.1 Asset Accounts** Section 3.6.

Step 7: Quality Assessment and Documentation

¶1 **Coverage estimate:**

Licensed vessels: 150
Vessels reporting catches: 138 (92%)
Estimated coverage of commercial fishing: 90-95%

¶2 **Known gaps:**

- ¶3 Subsistence fishing (not licensed): estimated 200–300 tonnes annually based on household surveys
- ¶4 Recreational fishing (licensed but not included in commercial statistics): estimated 50–100 tonnes annually
- ¶5 Unreported commercial fishing (IUU): unknown, likely <5% based on enforcement records

¶6 Data quality flags:

- ¶7 License register: Good quality, updated annually, 92% reporting rate
- ¶8 Catch reports: Moderate quality, 8% late submission, 0.5% spatial violations, <1% plausibility issues
- ¶9 Classification: Standard ISSCAAP codes used, consistent with international reporting

¶10 Comparability with previous years:

- ¶11 2022 total catch: 2,156 tonnes
- ¶12 2023 total catch: 2,283 tonnes (6% increase)
- ¶13 Change consistent with license register growth (5 additional licenses issued in 2023)

¶14 Integration with other accounts:

¶15 This physical catch account feeds into:

- ¶16 Fisheries asset accounts (extraction component, see **TG-6.7 Fisheries Accounting**)
- ¶17 Supply-use tables (domestic production of seafood products, see **TG-3.3 Economic Activity**)
- ¶18 Trade accounts (when combined with customs export data, see Section 3.2)

Lessons from the Example

1. ¶1

Integration requires unique identifiers – Vessel_ID enabled linking across the licence register, catch reports, and business register. Consistent identifiers are a prerequisite.

2. ¶2

Coverage gaps and data confrontation – Some licensed vessels will not report. Cross-checking against licensed zones and vessel capacities identifies implausible records. Document known gaps for users.

3. ¶3

Mappings and documentation must be maintained – Species and zone codes require translation to standard classifications, and full source documentation is essential for fitness-for-use assessment and future revision.

3.6 Quality Assurance for Administrative Data

¶1 The generic data-quality framework (UN NQAF dimensions: assessment, documentation, uncertainty) is in **TG-0.7 Quality Assurance Principles**. The subsections below address quality issues specific to administrative-data reuse: coverage gaps from regulatory scope, IUU adjustment, conceptual alignment with SNA, and data confrontation against survey benchmarks.

3.6.1 Coverage and Completeness

¶1 Administrative coverage depends on regulatory scope. Under-coverage arises for subsistence and recreational fishing without licensing, small vessels exempt from AIS, and informal-sector activities outside business registers. Over-coverage from inactive licence holders is handled via the materiality threshold and register audit in Section 3.1.1. SEEA AFF requires IUU fishing to be reflected in catch statistics where feasible, often via model-based estimation²⁷.

¶2 **Tiered IUU estimation approach.** Compilers should apply the following tiered methodology to produce IUU adjustment estimates:

1. ¶3 **Primary – AIS dark-vessel analysis.** Where national or regional surveillance data are available, use AIS dark-vessel analysis (Global Fishing Watch or equivalent national system) to identify non-reporting periods and estimate unreported effort.
2. ¶4 **Secondary – catch reconstruction.** Where catch reconstruction data exist (e.g., Sea Around Us national reconstruction series), apply the reconstruction methodology to produce an IUU adjustment estimate and reconcile against reported landing declarations.
3. ¶5 **Default – regional governance proxy.** For data-poor contexts lacking both surveillance and reconstruction data, apply a default IUU adjustment factor of **15–30% of reported catch**, calibrated to regional enforcement-capacity proxies (e.g., OECD/FAO Fisheries Outlook governance indicators), and flag the estimate as a modelled default.

¶6 Regardless of tier, IUU estimates must be: (a) labelled as “modelled – IUU adjustment” in account tables; (b) published with explicit uncertainty intervals; (c) recorded in a separate account row from directly observed catch data, not merged into reported totals. SDG indicator 14.6.1 addresses the complementary trade-based dimension of IUU detection discussed in Section 3.2.1.

¶7 For small-scale and artisanal fisheries that are often under-represented in administrative data, complementary survey methods may be required, as discussed in **TG-4.2 Survey Methods**. Specific methods for estimating the contribution of the informal sector to fisheries output include:

- ¶8 **Frame surveys** – Periodic enumeration of landing sites, vessels, and fishing gear to establish the population of informal operators. Frame surveys are particularly effective in the Pacific Islands context where artisanal fisheries are concentrated at known landing points. The survey establishes a sampling frame from which regular catch monitoring can be conducted.
- ¶9 **Catch assessment surveys** – Systematic sampling of landings at selected sites over defined periods, with results raised to the total population using frame survey estimates. The FAO recommends stratified sampling by landing site, vessel type, and season to capture the variability inherent in small-scale fisheries²⁸.
- ¶10 **Household surveys** – Labour force surveys or household income and expenditure surveys that include questions on fishing activity, catch quantities, and disposal (sale, subsistence consumption, barter). These surveys capture the full population of fishing households, including those not registered in any administrative system.
- ¶11 **Key informant estimation** – For the smallest-scale activities, community-level estimates from fisheries officers or village leaders can provide plausibility bounds when more rigorous methods are not feasible.

¶12 Compilers should document the methods used to estimate informal sector contributions and the associated uncertainty, and flag the resulting estimates as modelled rather than directly observed.

3.6.2 Conceptual Alignment

¶1 Administrative concepts may not align with statistical definitions:

¶2 **Timing differences** – Administrative records may be dated by registration rather than occurrence (e.g., landing date versus catch date)

¶3 **Valuation differences** – Customs values (CIF/FOB) may differ from the transaction prices required for national accounts

¶4 **Classification differences** – Administrative product codes may not correspond to statistical classifications (CPC, HS)

¶5 **Geographic scope** – Jurisdictional boundaries for regulation may differ from accounting territories

¶6 Conceptual alignment requires documentation of differences and systematic bridging procedures that transform administrative data to statistical frameworks²⁹.

¶7 **Valuation basis of customs records.** Customs records report CIF values for imports and FOB values for exports, whilst SNA supply-use tables require flows valued at basic prices. Compilers should deliver customs-sourced trade variables in their **recorded basis, labelled as CIF or FOB**, together with the freight, insurance, margin and product-tax fields needed to convert them. Choosing and applying the price basis for the supply-use cell is a valuation decision taken in the account: see **TG-3.3 Economic Activity Relevant to the Ocean**, and SNA 2025 Chapter 15 paras. 15.36–15.42 with IMTS 2010 Chapter 4 for the underlying conventions.³⁰ The trade margin coefficients and product-tax rates required for that conversion should be obtained from the national accounts unit responsible for the published supply-use tables rather than estimated within the source-processing step.

3.6.3 Data Confrontation

¶1 The general data confrontation framework, comprising internal consistency checks, cross-source reconciliation, benchmark comparison, and physical plausibility assessment, is covered in **TG-4.6 Data Harmonisation and Interoperability** Section 3.5 (Phase 3: Validate)³¹. For administrative data specifically, confrontation of landing declarations against customs export records and vessel-capacity range checks against catch reports are the most productive cross-source checks. These are illustrated in the worked example in Section 3.5.^{32, 33}

3.6.4 Temporal Consistency

¶1 Time series analysis of administrative data should identify:

- ¶2 Breaks in series due to changes in regulatory scope or concepts
- ¶3 Changes in reporting compliance over time
- ¶4 Effects of digitisation or administrative reforms on data availability

¶5 Where discontinuities exist, back-casting or adjustment procedures may be required to produce consistent time series for accounting purposes.

3.6.5 Institutional Arrangements for Data Access

¶1 Access to administrative data for statistical purposes requires legal authority, data sharing agreements, secure transfer infrastructure, and confidentiality protocols.³⁴ Template agreements and the full governance framework are in **TG-0.7 Institutional Arrangements** and **TG-4.7 National Data Coordination Architectures**.

3.7 Upward Connections to Account Uses

¶1 Administrative data flow into multiple components of Ocean Accounts and support several analytical uses. Understanding these upward connections helps compilers prioritize data development efforts and communicate the value of administrative data integration to custodian agencies. Table 3.7.1 maps the main administrative sources to the account components they populate and the policy uses they support.

¶2 *Table 3.7.1: Administrative data sources, account components, and policy uses*

Administrative Source	Account Component	Policy Use
Fishing licenses	Fisheries asset accounts (vessel capacity, fleet structure)	Fleet management, overcapacity assessment, license allocation policy
Landing declarations	Physical flow accounts (catch by species and zone)	Stock status monitoring, SDG 14.4.1 reporting, quota compliance
Aquaculture permits	Cultivated asset accounts (production capacity, spatial distribution)	Aquaculture development planning, coastal zone management

Administrative Source	Account Component	Policy Use
Customs trade data	Supply-use tables (imports/exports by product)	Trade policy, value chain development, IUU fishing detection
Vessel tracking (AIS/VMS)	Pressure accounts (fishing effort, shipping emissions by zone)	Marine spatial planning, MPA effectiveness, SDG 14.5 indicators
Offshore permits	Mineral asset accounts (reserves, extraction), residual flow accounts	Resource management, environmental impact assessment, dumping regulation
Port statistics	Maritime transport accounts (cargo throughput, vessel movements)	Port infrastructure investment, shipping efficiency, connectivity indices

¶3 These connections indicate that administrative data serve several account purposes at once. For example, fishing licence data feed into both asset accounts (measuring the capital stock of the fishing fleet) and pressure accounts (measuring fishing effort by zone). Because a single source serves several account domains, investment in improving administrative data quality generates benefits across all of them.

¶4 Compilers should maintain a register of administrative sources showing which account components depend on each source, the update frequency required, and the priority for quality improvement. This register supports dialogue with custodian agencies and demonstrates the value of their data systems for national statistical programmes, whilst enabling coordinated improvements in data infrastructure.

3.7.1 Administrative Source Register – Minimum-Fields Template

¶1 To support comparability across countries and regional benchmarking, the source register should capture the following ten minimum fields for each administrative source:

#	Field	Description
1	Source ID	Unique alphanumeric identifier assigned by the compiling agency
2	Source name	Common name of the register or dataset
3	Custodian agency	Agency with statutory authority over the source (per Section 3.1.0)
4	Legal access basis	Citation of legislation or reference to inter-agency data-sharing agreement
5	Data elements available	List of fields supplied to the compiling agency
6	Update frequency	Annual / quarterly / continuous
7	Typical lag (months)	Months from reference-period close to data availability
8	Format	Relational database / spreadsheet / PDF / API endpoint
9	Account components populated	Cross-referenced to account-table rows that depend on the source
10	Data quality rating	1–5 against NQAF dimensions; date last reviewed

¶2 **Example completed row – national fishing license register:**

#	Field	Entry
1	Source ID	NLR-FISH-001
2	Source name	National Fishing License Register
3	Custodian agency	Ministry of Fisheries – Licensing Division
4	Legal access basis	Statistics Act s.24 + MoU between NSO and Ministry of Fisheries (2024)

#	Field	Entry
5	Data elements available	License ID, vessel ID, operator name, valid-from/to dates, authorised zone, target species, gear type, license fee paid
6	Update frequency	Annual (with quarterly amendments file)
7	Typical lag (months)	3 months
8	Format	Relational database extract (CSV via SFTP)
9	Account components populated	Fisheries asset accounts (capital stock); supply-use (government revenue); physical flow (capacity benchmark)
10	Data quality rating	4 / 5 (high accuracy, moderate timeliness); reviewed 2025–11

¶3 The source register should be maintained under the governance framework set out in **TG-0.7 Institutional Arrangements** and reviewed at each annual inter-agency data-governance meeting.

4. Summary

¶1 Administrative data sources provide essential inputs for Ocean Accounts and offer wide coverage of regulated maritime activities at relatively low cost. These three data categories together describe the population, scope, flows, and activity patterns of ocean-related maritime activity. Effective use of these data sources requires attention to quality assurance, conceptual alignment with statistical frameworks, and institutional arrangements for data sharing. The accounting framework itself provides a mechanism for confronting data from multiple sources and identifying inconsistencies that can then be resolved through consultation with data custodians.

¶2 National statistical offices and ocean accounting agencies should develop systematic programmes to identify, access, and integrate administrative data sources, working collaboratively with regulatory authorities to improve data quality and expand coverage over time. The compilation workflow presented in Section 3.4 and the worked example in Section 3.5 provide practical guidance for transforming administrative records into account-ready data, including the physical-to-monetary extension, whilst Section 3.7 demonstrates the multiple account uses that administrative data support and provides a minimum-fields template for the source register that anchors inter-agency data governance.

¶3 Administrative data are a foundation for ocean accounting, particularly in countries where statistical capacity is limited and survey programmes are costly. By building partnerships with fisheries authorities, maritime agencies, customs administrations, and other custodians of administrative data, statistical offices can compile Ocean Accounts that support evidence-based ocean management and contribute to SDG 14 monitoring and reporting.

5. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

FOOTNOTES

- ¶1 United Nations, 2014, *System of Environmental-Economic Accounting 2012: Central Framework*, Chapter VI, recognizing the importance of integrating data from diverse sources including administrative records for environmental-economic accounts.
- ¶2 Wallgren, A. and B. Wallgren, 2014, *Register-based Statistics: Administrative Data for Statistical Purposes*, 2nd edition, Wiley, Ch. 1.
- ¶3 Food and Agriculture Organization (FAO), 2020, *The State of World Fisheries and Aquaculture 2020*, Ch. 4 on fisheries governance and management frameworks.
- ¶4 United Nations, 1982, *United Nations Convention on the Law of the Sea (UNCLOS)*, Article 56 establishes sovereign rights of coastal States over living resources in the EEZ; Article 57 specifies the 200 nautical mile limit.

5. ¶5 United Nations and FAO, 2018, *System of Environmental-Economic Accounting for Agriculture, Forestry and Fisheries* (SEEA AFF), para. 3.164, distinguishing capture fisheries (ISIC 031) and aquaculture (ISIC 032).
6. ¶6 FAO, 1994 (updated), *Converting fish catches to live weight equivalent: conversion factors for 178 species*; FFA Vessel Day Scheme documentation on species-specific catch-per-vessel-day coefficients.
7. ¶7 OECD, 2006, *Using Market Mechanisms to Manage Fisheries: Smoothing the Path*, discusses ITQ systems and their data implications for resource valuation.
8. ¶8 SNA 2025, para. 20.14, on the treatment of idle fixed assets in balance sheets; FAO, 2003, *The Use of Vessel Monitoring Systems in Fisheries Management*, Section 4 on fleet register reconciliation.
9. ¶9 SEEA AFF, para. 3.166, defines aquaculture as farming of aquatic organisms with intervention in the rearing process and ownership of cultivated stock.
10. ¶10 SEEA AFF, para. 2.39, notes that residual flows from agriculture, forestry and fisheries activities can be incorporated as extensions to physical flow accounts.
11. ¶11 SEEA CF paras. 3.138–3.140 on residual flows and gross recording; Boyd et al. (2020), *Achieving sustainable aquaculture: Historical and current perspectives*, discussing IMTA nutrient accounting.
12. ¶12 UNCLOS Part VI (Continental Shelf) and Part XI (The Area) establish the framework for mineral resource exploitation in maritime zones.
13. ¶13 International Maritime Organization, 1996, *1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972* (London Protocol).
14. ¶14 UNCLOS Article 246 specifies conditions for marine scientific research in the EEZ, requiring consent of the coastal State.
15. ¶15 SEEA CF paras. 5.19–5.22 on the accounting boundary for subsoil assets; ISA Exploitation Regulations (2023 draft); UNCLOS Part XI (The Area).
16. ¶16 United Nations, 2010, *International Merchandise Trade Statistics: Concepts and Definitions 2010*, provides standards for trade statistics based on customs data.
17. ¶17 SEEA AFF, para. 3.168, specifies that imports of fisheries commodities should be recorded in live weight equivalent for consistency in physical flow accounts; see also para. 3.165 on nominal catch in live weight equivalent.
18. ¶18 SEEA AFF, para. 3.153, on the structure of supply and use for fish products including domestic production, imports, intermediate use, consumption and exports; with import recording guidance at para. 3.168.
19. ¶19 SEEA AFF, para. 3.176–3.177, discusses the treatment of fish caught by foreign vessels in a country's EEZ and the distinction between residence of fishing vessel operator and location of catch.
20. ¶20 United Nations, 2015, *Transforming our World: The 2030 Agenda for Sustainable Development*, SDG Target 14.6 and Indicator 14.6.1 on combating IUU fishing.
21. ¶21 International Maritime Organization, SOLAS Convention Chapter V, Regulation 19, establishes AIS carriage requirements for vessels on international voyages.
22. ¶22 Global Fishing Watch, 2018, *Tracking the Global Footprint of Fisheries*, demonstrates large-scale analysis of fishing activity from AIS data.
23. ¶23 Kroodsma, D.A. et al., 2018, *Tracking the global footprint of fisheries*, *Science* 359(6378): 904–908, providing methods for inferring fishing behaviour from vessel tracks.
24. ¶24 FAO, 2015, *Voluntary Guidelines for Flag State Performance*, addresses monitoring and surveillance including VMS requirements for fishing vessels.
25. ¶25 United Nations Economic Commission for Europe (UNECE), 2011, *Using Administrative and Secondary Sources for Official Statistics: A Handbook of Principles and Practices*, provides comprehensive guidance on quality assessment.
26. ¶26 SNA 2025, paras. 6.51–6.55 on output at basic prices; SEEA AFF, Chapter 3 on monetary flow accounts.
27. ¶27 SEEA AFF, para. 3.162, notes that gross catch should in theory include IUU fishing but this is difficult in practice; para. 3.165 similarly notes that nominal catch should in principle include retained catch from IUU activity.
28. ¶28 FAO, 2002, *Sample-Based Fishery Surveys: A Technical Handbook*, FAO Fisheries Technical Paper No. 425, provides detailed guidance on catch assessment survey design for small-scale fisheries.
29. ¶29 SNA 2025, Chapter 15 (Supply and use tables), paras. 15.5 ff., describes data confrontation across sources including administrative data; see also the UNECE *Using Administrative and Secondary Sources for Official Statistics* (2011) for detailed bridging procedures.
30. ¶30 SNA 2025, Chapter 15 (Supply and use tables), paras. 15.36–15.42 on valuation of trade flows; IMTS 2010, Chapter 4 on valuation of merchandise trade.
31. ¶31 SEEA Central Framework, para. 1.58, notes that the accounting framework enables data confrontation and quality assessment across sources.
32. ¶32 SEEA AFF, para. 2.52, discusses consistency between physical flow accounts and asset accounts as a quality check mechanism.
33. ¶33 SEEA AFF, para. 3.13, emphasizes that the supply-and-use approach ensures internal consistency and coherence of data from different sources through confrontation and reconciliation.
34. ¶34 United Nations Fundamental Principles of Official Statistics, Principle 6, on confidentiality of individual data collected for statistical purposes.

DRAFT