

Marine Litter and Plastics Accounting

Provides guidance on establishing stock-flow accounts for marine litter and plastics within the Ocean Accounts framework.

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ABOUT THIS CIRCULAR

RECOMMENDED CITATION

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❗ Framework Position

This Circular owns the stock and flow accounts for marine litter and plastics: the material and source categories, the land-based and maritime input flows, the accumulation stocks by marine compartment, and the source attribution that connects them to economic units. It specialises [TG-3.4 Flows from Economy to Environment](#), which owns the residual-flow framework and the solid waste account this Circular's flows enter, and cross-refers for survey and administrative data methods ([TG-4.2](#), [TG-4.3](#), [TG-4.4](#)) and readiness ([TG-0.8](#)). Indicator derivation is not this Circular's: SDG 14.1.1 and the circular-economy indicators are built in [TG-2.7](#), [TG-2.10](#) and [TG-2.11](#); Section 3.7 states only what the accounts must carry for them. Nutrient pollution – the other half of SDG 14.1.1 – is [TG-6.13](#) and [TG-3.4](#).

1. Outcome

¶1 This Circular provides guidance on establishing stock-flow accounts for marine litter and plastics within the Ocean Accounts framework. Upon completing this Circular, readers will understand how to:

- ¶2 categorise marine litter by material type and source
- ¶3 compile flow accounts tracking litter from land-based and maritime sources to the marine environment
- ¶4 develop stock accounts for accumulated litter in coastal zones, surface waters, the water column, and the seafloor
- ¶5 attribute litter flows to economic sectors and geographic sources
- ¶6 align marine litter accounts with SDG Target 14.1 indicators on marine pollution
- ¶7 derive circular economy indicators linking litter accounts to plastics reduction targets under emerging international frameworks
- ¶8 compile material flow accounts for synthetic materials from production through disposal to marine leakage
- ¶9 score the availability and reliability of the national plastics data the accounts depend on, and prioritise the gaps worth closing first
- ¶10 establish the institutional mandate, stakeholder arrangements and reporting cycle that turn a one-off estimate into a repeatable account

¶11 The accounts compiled using this guidance support derivation of indicators for environmental pressure assessment in **TG-2.7 Pollution Flows**, contribute to assessment of residual flows from economy to environment in **TG-3.4 Flows from Economy to Environment**, inform circular economy indicators in **TG-2.11 Resource Efficiency**, and support reporting to the multilateral environmental agreements described in **TG-2.10 MEA Indicators**. Marine litter accounting also complements maritime transport activity accounts in **TG-6.10 Maritime Transport** where vessel-sourced litter is concerned.

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2. Requirements

¶1 This Circular requires familiarity with:

- ¶2 **TG-0.1 General Introduction** – foundational Ocean Accounts components and SIDS-specific considerations relevant to marine litter accounting in small island contexts.
- ¶3 **TG-3.4 Flows from Economy to Environment** – residual flow accounting, solid waste accounts, and attribution of emissions and waste to economic sectors, which underpins the marine litter flow accounting approach in Section 3.3.

3. Guidance Material

¶1 Marine litter is defined as any persistent, manufactured or processed solid material discarded, disposed of, or abandoned in the marine and coastal environment. It constitutes one of the most visible forms of marine pollution¹. Plastics are the dominant material category, accounting for approximately 80 percent of all marine debris by count².

¶2 SDG Target 14.1 (preventing and reducing marine pollution) provides the primary policy anchor for this Circular³. SDG indicator 14.1.1 specifically includes “floating plastic debris density” as a component of the index of coastal eutrophication and plastic debris density⁴. An INC process to develop a legally binding instrument on plastic pollution (UNEA Resolution 5/14, March 2022) is ongoing. Compilers should consult the UNEP INC website for current treaty status and emerging reporting obligations^{5, 6}.

¶3 **Scope – microplastics.** Microplastics (plastic particles less than 5mm in diameter, whether primary or secondary) are out of scope of this Circular. Detailed accounting for microplastic flows, stocks, and fragmentation is deferred pending further methodological development. This Circular addresses macroplastics (>25mm) and mesoplastics (5–25mm) only. Inline references to microplastics in the pathway descriptions are retained for completeness but are flagged as out-of-scope inputs that compilers should not attempt to quantify under this guidance. Countries developing experimental microplastic accounts should document methods separately and treat results as supplementary information.

¶4 The SEEA CF physical supply and use table structure for solid waste records waste generation by economic sector and tracks flows to collection, treatment, and disposal destinations^{7, 8}. For marine litter accounting, this framework is extended to capture waste that escapes management systems and enters the marine environment, as well as litter generated directly by maritime activities. General solid waste accounting structure follows **TG-3.4 Flows from Economy to Environment**.

¶5 **Operational companion.** This Circular specifies what a marine litter and plastics account contains and how its entries relate to one another. The *GOAP Plastics Data Collection and Reporting Handbook* specifies how a country finds, scores and generates the underlying data, and is the operational companion to this Circular⁹. Where this Circular calls for a quantity, the Handbook names the instrument that produces it – the Plastics Data Checklist, the Global Plastics Data Tracker, the survey and sampling protocols, and the classification code sets. The two documents share a deliberate scope boundary: neither provides quantified guidance for microplastics or for certified biodegradable materials, and neither covers extraction and processing upstream of primary polymer manufacture.

¶6 The Handbook also establishes the maturity sequence inside which this Circular’s compilation phases sit. Improving individual data points yields a **plastics data inventory** – a coherent collection of data points measuring flows across the value chain. An inventory becomes a **plastics account** only when its data categories are reproduced periodically under a documented, standing methodology¹⁰. The distinction has practical force: a single well-researched estimate of marine leakage is an inventory entry, not an account, and the accounting entries in Sections 3.3 to 3.6 assume the repeatability that Section 4 sets out to secure.

¶7 The starting point for most countries is sparse. A 2025 review of government-reported plastics data for every UN Member State found that 10 percent of countries report no plastics data at all and 60 percent report no data on waste generation¹¹. Compilers should expect the first cycle to be a data-development exercise as much as an accounting one, and should read Section 4 before attempting the flow and stock tables.

3.1 Decision Use Cases and Upward Connections

Plastics treaty reporting and compliance monitoring

¶1 Marine litter accounts link plastics material flow accounts (tracking production and use) to waste management accounts (tracking collection and disposal) to residual flow accounts (tracking marine leakage). This linkage eliminates redundant data collection across reporting obligations and keeps national waste statistics and international environmental monitoring consistent with one another.

Circular economy metrics for plastics

¶1 Marine litter accounts quantify the proportion of plastic waste that escapes collection and treatment systems, providing the “leakage rate” indicator central to circular economy assessment. SEEA CF paras 3.268–3.278 establish the applicable residual flow framework¹². These indicators feed directly into **TG-2.11 Resource Efficiency**.

Beach and ocean cleanup investment justification

¶1 Where the case for cleanup rests on protecting tourism revenue, the revenue figure should be taken from the marine and coastal tourism segment compiled in **TG-6.14**, so that the benefit claimed and the sector account agree.

¶2 Stock accounts by environmental compartment (beach, floating, benthic) provide baseline estimates of litter volumes requiring removal. Flow accounts by source category enable prioritisation of interventions targeting high-contribution pathways. Time-series accounts tracking stock changes before and after cleanup programmes provide the quantitative basis for return-on-investment assessment. This use case links to environmental protection expenditure accounts addressed in **TG-3.7 Governance Accounts**.

Upward connections to indicator frameworks

- ¶1 **SDG 14.1.1 (Marine pollution)** – directly supplies floating plastic debris density component¹³
- ¶2 **Pollution pressure indicators (TG-2.7)** – provides physical flow data for litter generation intensity, mismanaged waste rates, and marine leakage indicators
- ¶3 **Circular economy indicators (TG-2.11)** – enables calculation of recycling rates, waste utilisation rates, and decoupling factors
- ¶4 **MEA reporting (TG-2.10)** – supports Kunming-Montreal Global Biodiversity Framework Target 2 and UNFCCC reporting

¶5 The combined presentations approach in **TG-3.8 Combined Presentations** provides methods for integrating marine litter account data with economic and ecosystem condition accounts.

3.2 Marine Litter Framework: Categories, Sources, and Pathways

Aligning contested definitions

¶1 The terms on which marine litter accounts depend – mismanaged waste, leakage, litter, dumping – carry materially different definitions across the frameworks a compiler will draw on. UNEP’s 2024 assessment of plastics terminology records at least two competing definitions each for *mismanaged waste*, *leakage* and *sanitary landfill*, advocated respectively by the UNEP/IUCN Hotspotting methodology, the OECD, GIZ’s Waste Flow Diagram and UN-Habitat’s Waste Wise Cities Tool¹⁴. The divergences are not cosmetic.

Term	Narrower reading	Broader reading	Accounting consequence
Mismanaged waste	Uncollected waste plus improperly disposed waste (UNEP/IUCN Hotspotting; PLASTEAX)	Any waste not captured by state-of-the-art collection or treatment, including unsanitary landfills and dumpsites (OECD)	The broader reading moves waste in unsanitary landfills from inside the economy to the mismanaged pool, raising both the mismanaged rate and the base to which leakage factors apply
Leakage	Plastic released to rivers, lakes and oceans (PLASTEAX)	Plastic entering any environmental compartment, including soils and air (UNEP/IUCN; OECD)	The broader reading is not the residual flow to marine waters; using it without adjustment inflates the marine leakage estimate
Litter/ littering	Incorrect disposal of small one-off items, which street cleaning may or may not recover (UNEP/IUCN)	Waste arising from littering and fly-tipping, treated as distinct from mismanaged waste because it is not correlated with collection infrastructure (OECD)	Under the broader reading litter must be estimated separately rather than derived from collection coverage
Dumping	Deliberate uncontrolled disposal of large quantities in a particular area, from the formal or informal sector (UNEP/IUCN)	Overlaps with <i>fly-tipping</i> , the deliberate disposal of large items or quantities at no specific location	Double-counting risk whenever the two are estimated from separate surveys

¶2 Accounts are not comparable across countries unless the definition applied to each entry is stated. Compilers should record, for every row of the flow and stock accounts, which definition has been applied and which source it comes from, and should not mix readings within a single time series. Where a country's own legal definitions differ from all of the above, the national definition governs the account and the divergence is documented in the metadata.

¶3 The three waste measurement points must also be kept distinct, because they are measured at different places in the chain and are not interchangeable¹⁵:

- ¶4 **Waste generated** – the total plastic discarded within the system boundary during the period, regardless of subsequent fate.
- ¶5 **Waste collected** – measured at the point of collection, before sorting or processing; includes contamination and material that will later be rejected.
- ¶6 **Waste treated** – measured after sorting and cleaning, on entry to recycling, energy recovery or other treatment.
- ¶7 **Recovered tonnes** – the material that completes the recycling process and leaves the facility as saleable recyclate.

¶8 Collection and treatment figures should each be split between formal and informal management (Sections 3.3 and 3.5).

Material categories

¶1 **Plastics** – the dominant component, requiring disaggregation by:

- ¶2 Polymer type (polyethylene, polypropylene, polystyrene, PET, PVC, other polymers)
- ¶3 Product category (packaging, single-use items, fishing gear, consumer goods, industrial materials)
- ¶4 Size class (macroplastics >25mm, mesoplastics 5–25mm, microplastics <5mm)

¶5 Bioplastics and materials marketed as biodegradable warrant careful treatment. Many do not degrade under marine conditions and should be accounted equivalently to conventional plastics.

For materials with certified marine biodegradability (per ISO 18830:2016 and ISO 19679:2016 or equivalent), compilers may apply a degradation rate in the stock account's outflow rows rather than treating the material as persistent. ISO 18830 and ISO 19679 certify aerobic biodegradation potential under controlled laboratory conditions and do not directly yield field rate constants. Compilers wishing to apply a degradation outflow should derive a first-order rate constant from field studies, document the temperature, UV, and turbulence assumptions applicable to the accounting area, and record the mass outflow in a dedicated "Certified biodegradation" row separate from the general "Degradation" row. Where certified degradation rates are unavailable, conservative practice treats all plastics as persistent.

¶6 **Other materials** – including glass and ceramics, metal, rubber, textiles, paper and cardboard, processed wood, and other manufactured materials.

¶7 The GESAMP Guidelines for the monitoring and assessment of plastic litter in the ocean provide a harmonised categorisation framework¹⁶. The European Waste Catalogue (EWC-Stat) offers additional detail for waste source identification¹⁷.

Classification systems and codes

¶1 Accounts assembled from production, trade and waste statistics inherit those statistics' classifications. The code sets below are the ones a compiler will actually query, and using them consistently is what makes the material flow account in Section 3.6 reconcilable against official statistics¹⁸.

System	Domain	Plastics codes
ISIC	Production, consumption	20.16 plastics in primary forms; 22.20 plastic products; 38.32 recovery of sorted materials
CPC	Production, consumption, trade	Group 347 primary forms; 363 semi-manufactures; 364 packaging; 369 other plastic products
PRODCOM (EU)	Production	Divisions 20 and 22, at eight digits
NAICS (North America)	Production	325211 resin manufacturing; 326 plastics and rubber products; 326199 other plastic products
HS	Trade	3901-3914 primary forms; 3915 waste and scrap; 3916-3926 products
SITC	Trade	Division 57 primary forms; 58 non-primary forms; 893 articles of plastic
Basel Convention	Waste, trans-boundary movement	Y48 (Annex II); A3210 (Annex VIII, hazardous); B3011 (Annex IX, clean recyclable)
European List of Waste (EWC/LoW)	Waste	15 01 02 packaging; 02 01 04 agriculture and horticulture; 07 02 13 plastics manufacturing; 12 01 05 shavings and turnings; 16 01 19 end-of-life vehicles; 17 02 03 construction and demolition; 19 12 04 mechanical treatment of waste; 20 01 39 separately collected municipal fractions
EWC-Stat	Waste statistics	07.4 plastic waste; 07.4.1 plastic packaging waste; 07.4.2 other plastic wastes
Plastic-KEYs (UNITAR)	Finished products	59 keys in eight groups: P1 packaging, P2 transport, P3 building and construction, P4 electrical and electronic equipment, P5 consumer and institutional products, P6 industrial machinery, P7 textiles, P8 other

¶2 The systems carrying a legal mandate – HS for trade, ISIC and NAICS for production, and the Basel Convention for waste – are the most consistently populated and should anchor the account; the others supply detail¹⁸. One break in comparability is worth flagging: the Basel Convention's plastic waste entries took effect on 1 January 2021, so transboundary plastic waste series do not run continuously across that date.

¶3 Where polymer disaggregation is attempted, the practical reporting set is PET, HDPE, PVC, LDPE and LLDPE, PP, and PS and EPS¹⁹.

Source categories

¶1 **Land-based sources** – estimated to contribute approximately 80 percent of marine litter globally (Jambeck et al. 2015), including municipal solid waste, industrial and manufacturing residues, construction and demolition waste, agricultural plastics, sewage-related debris, coastal tourism and recreation waste, and riverine transport from inland areas.

¶2 **Sea-based sources** – including: fishing activities (abandoned, lost, or discarded fishing gear – ALDFG); shipping (cargo loss, operational waste); offshore energy operations; aquaculture (equipment, floats, feed bags); recreational boating; and maritime structures and port operations.

¶3 **Release routes within the waste system** – uncollected, dumped and burned waste are distinct release routes rather than a single residual, and the distinction carries into the account²⁰:

- ¶4 **Uncollected waste** – all solid plastic waste that escapes waste management systems, formal and informal alike.
- ¶5 **Open dumping** – waste deliberately discarded at unauthorised, uncontrolled or unmanaged locations without containment or treatment.
- ¶6 **Open burning** – waste deliberately set on fire by households, businesses or industry to reduce volume.
- ¶7 **Fly-tipping** – deliberate disposal of large items or quantities at no particular location.
- ¶8 **Littering** – incorrect disposal of small, one-off items unlikely to be recovered by managed collection.

¶9 Open burning matters to the account for a reason easily missed: it removes mass from the pool available for marine leakage while creating an emissions flow recorded elsewhere. Burned plastic should be recorded as an explicit outflow from the mismanaged waste pool rather than left implicitly available to leak, with the corresponding emissions cross-referenced to greenhouse gas inventory reporting (Section 3.3).

¶10 The relative contribution of different sources varies by location. SIDS may have higher proportionate contributions from sea-based sources. See SIDS-specific considerations in **TG-0.1 General Introduction**²¹.

Pathways to the marine environment

Pathway	Description
Direct coastal input	Waste deposited, blown, or washed directly from coastal zones into the sea.
Riverine transport	Waste carried by rivers from upstream sources; rivers are major conduits for land-based marine litter ²² .
Stormwater and urban runoff	Waste transported through drainage systems during precipitation events.
Wastewater discharge	Microplastics and other debris not removed during wastewater treatment.
Atmospheric transport	Lightweight items and microplastics transported by wind.
Open dumping and fly-tipping	Waste deposited at uncontrolled sites or discarded at no particular location, from which wind, runoff and watercourses mobilise it ²⁰ .
Open burning	Waste burned to reduce volume; a competing fate that removes mass from the leakage pool and creates an emissions flow instead ²⁰ .
Direct disposal at sea	Deliberate dumping (regulated under the London Convention and Protocol) ²³ .
Accidental loss at sea	Cargo loss, equipment failure, vessel incidents.

¶1 The SEEA CF notes that controlled landfills are within the economy, whilst uncontrolled disposal to the environment represents a residual flow²⁴. For marine litter accounting, waste reaching marine waters represents a flow to the environment recorded in residual flow accounts.

¶2 Figure 6.12.1 summarises marine litter stock-flow relationships (see also TG-3.4 Section 3.2).

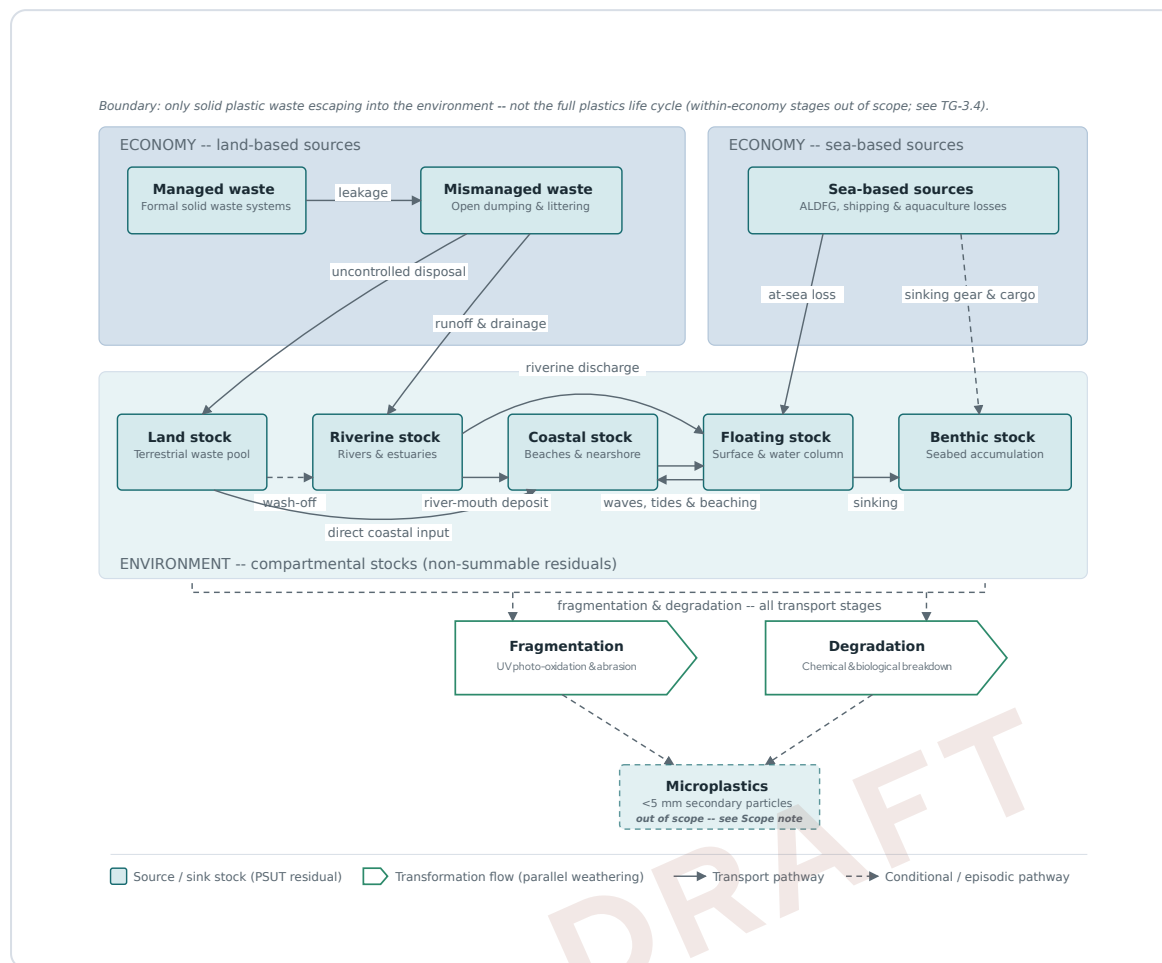


Figure 6.12.1 Marine solid-plastic residual flows from managed and mismanaged sources through coastal, floating, and benthic stocks toward microplastics. Dashed edges = conditional/episodic paths; double arrow = coastal ↔ floating exchange; microplastics terminal muted (out of scope). Stocks non-summable.

Scope: Escape residuals only; economy-side waste SUT out of scope -- TG-3.4.

Source: TG-6.12 (marine solid plastic waste accounting framework); SEEA CF 2012, Chapter 3 (residual flows and waste treatment); UNEP/GESAMP 2021 (Sources, Fate and Effects of Microplastics in the Marine Environment, Pt. 2), paras. 2.1--2.4.

3.3 Flow Accounting: Litter Inputs to the Marine Environment

¶1 Flow accounts record the quantity of litter entering the marine environment during an accounting period, measured in mass units (tonnes) or, for monitoring purposes, item counts.

Land-based source flows

¶1 Land-based litter flows require estimation of:

- ¶2 **Mismanaged waste** – waste not formally collected or improperly disposed after collection
- ¶3 **Leakage rates** – the proportion of mismanaged waste that reaches marine waters (dependent on proximity to coast, hydrological connectivity, and waste characteristics)

¶4 The methodology developed by Jambeck et al. (2015) estimates plastic waste input from land to ocean based on coastal population, waste generation rates, waste management infrastructure, and modelled leakage²⁵:

$$\begin{aligned} \text{Plastic marine debris} = & \text{Coastal population} \times \\ & \text{Waste generation rate} \times \\ & \text{Plastic content of waste} \times \\ & \text{Inadequately managed waste share} \times \\ & \text{Leakage factor to ocean} \end{aligned}$$

¶5 Lau et al. (2020) extended this framework for scenario analysis of waste management interventions and material substitution²⁶. Borrelle et al. (2020) projected plastic waste growth trajectories²⁷.

¶6 For ocean accounting purposes, this estimation approach should be disaggregated by economic sector where possible, geographically referenced to identify priority coastal areas, and time-series consistent to track trends.

¶7 **Default composition data where national studies are absent.** Every term in a Jambeck-type estimator after coastal population depends on the plastic fraction of municipal solid waste, which many countries have never measured. Two fallbacks precede borrowing a neighbouring country's figure. Countries reporting to the UNFCCC often already hold waste composition data compiled for national atmospheric emissions inventories, prepared in order to calculate landfill emissions; this is the preferred fallback because it is nationally specific and already quality-assured²⁸. Failing that, the IPCC's regional default plastic shares of municipal solid waste provide a documented tier-1 assumption²⁹:

Region	Plastic share of MSW (%)	Region	Plastic share of MSW (%)
Central Asia	8.4	Eastern Europe	4.6
Eastern Asia	6.5	Northern Europe	4.9
South-Eastern Asia	10.2	Southern Europe	11.8
Southern Asia	7.0	Western Europe	20.5
Western Asia	17.2	Central America	10.3
Northern Africa	13.8	South America	13.7
Eastern Africa	8.0	Northern America	15.8
Middle Africa	7.1	Australia and New Zealand	8.3
Southern Africa	26.5	Western Africa	6.4

¶8 A regional default is an interim device, not a result. It should be tagged as such in the account's metadata and replaced by a national waste composition study – systematic sampling and manual sorting of waste streams, typically 100–200 kg per sampling event, repeated to capture seasonal variation – as soon as one exists³⁰. Because composition studies are point-in-time and resource-intensive, they are usually run quarterly or annually rather than continuously, so the account should state which study year each composition assumption comes from.

¶9 **Open burning.** Where open burning is material, the IPCC provides a standardised estimator that can be adapted to yield the plastic mass burned rather than only the resulting emissions³¹:

¶10

$$SW = P \times P_{frac} \times SW_c \times B_{frac} \times 365 \times 10^{-6}$$

¶11 Here SW is the total solid waste openly burned (Gg per year), P the population, P_{frac} the fraction of the population burning waste, SW_c per capita waste generation (kg per person per day), and B_{frac} the fraction of waste burned relative to total waste treated. Multiplying through by

the plastic fraction of the waste stream gives the plastic mass burned. Some of this waste originates from uncollected sources and some from collected sources, so compilers must take care not to deduct it twice.

¶12 **Collection coverage and the informal sector.** Mismanaged waste is normally derived as generation minus formal collection, which systematically overstates it wherever an informal collection sector operates. Three collection systems should be measured separately³²:

- ¶13 **Formal** – government-approved or contracted services operating through established infrastructure with regular schedules and official protocols.
- ¶14 **Informal** – waste pickers, itinerant buyers and small-scale entrepreneurs recovering saleable plastic outside municipal systems.
- ¶15 **Community-based** – environmental groups, community organisations and volunteer networks conducting periodic collection drives and clean-ups that supplement formal services where coverage is incomplete.

¶16 Informal recovery is not marginal. An estimated 15 million people work as informal waste collectors in developing countries, around one percent of the urban population³³. Omitting their recovery from the collected column transfers that mass to the mismanaged pool and then, through the leakage factor, into the marine leakage estimate. Collection coverage – the share of population or area with access to collection services – should be recorded alongside tonnages, because the two constrain one another.

¶17 The SEEA CF physical supply and use table for solid waste provides the structural framework³⁴:

Flow Category	Physical Unit	Recording
Waste generation by industry	Tonnes	Supply table, by ISIC class
Waste generation by households	Tonnes	Supply table, household sector
Waste collected	Tonnes	Use table, waste management industry
Waste to controlled disposal	Tonnes	Use table, controlled landfill/incineration
Waste to environment	Tonnes	Use table, environment (residual flow)

¶18 For marine-specific accounting, “waste to environment” is disaggregated to distinguish:

- ¶19 Waste to marine and coastal waters
- ¶20 Waste to inland waters (with subsequent marine pathway)
- ¶21 Waste to land (coastal littering, beach deposits)

Maritime source flows

¶1 **Fishing gear losses** – ALDFG estimation uses fishing and aquaculture activity data from TG-6.7 and TG-6.8. Abandoned, lost, or discarded fishing gear is estimated at 5.7 percent of fishing nets, 8.6 percent of traps, and 29 percent of fishing lines lost globally each year³⁵. These global average rates may not reflect conditions in artisanal fisheries. Compilers should apply gear-specific and fishery-specific loss rates where available from national or regional fisheries management organisations³⁶. Accounting requires data on fishing fleet composition, gear types, estimated loss rates, and conversion to mass units.

¶2 **Vessel operational waste** – MARPOL Annex V regulates discharge of garbage from ships³⁷. Accounting draws on port reception facility records, MARPOL incident reporting, and vessel surveys.

¶3 **Offshore operations** – Waste from offshore energy platforms, aquaculture installations, and maritime structures. Cross-reference to **TG-6.9 Offshore Energy** for offshore accounting context.

¶4 **Cargo losses** – Container losses and other cargo overboard incidents, reported under maritime incident databases.

Riverine inputs

¶1 Rivers transport substantial quantities of litter from inland areas to the marine environment, with a small number of rivers contributing a disproportionate share of global riverine plastic input³⁸.

Accounting requires:

- ¶2 Monitoring of litter concentrations in river outflows
- ¶3 Estimation of total transport based on flow volumes
- ¶4 Attribution to upstream catchment sources where possible

¶5 For national ocean accounts, riverine inputs represent the cumulative effect of upstream waste management and should be linked to inland waste generation and management accounts.

Hydrological data used for water flow accounting may serve as a basis for estimating litter transport volumes where direct litter monitoring data are limited.

3.4 Stock Accounting: Marine Litter Accumulation

¶1 Stock accounts record the quantity of litter accumulated in the marine environment at the opening and closing of an accounting period. The following template provides a compilation framework.

¶2 *Table 3.4.1: Marine litter physical stock-flow account (tonnes)*

Entry	Floating	Beach	Seabed	Water Column	Total
Opening stock	850	1,240	3,100	420	5,610
Inflows					
Land-based input (rivers)	180	–	–	–	180
Land-based input (direct coastal)	–	95	–	–	95
Sea-based input (shipping, fishing)	45	–	12	–	57
Import via ocean transport (transboundary)	0	0	0	0	0
Transfer from other compartment	25	110	65	15	215
Total inflows	250	205	77	15	547
Outflows					
Collection/removal	–	140	–	–	140
Degradation	12	8	5	3	28
Transfer to other compartment	135	65	–	15	215
Export (currents)	25	–	–	–	25
Total outflows	172	213	5	18	408
Closing stock	928	1,232	3,172	417	5,749

¶3 The “primary entry” notation indicates the compartment where each source type is first recorded. Subsequent redistribution is captured through transfer rows. Inter-compartment transfers balance: total outflows as transfers (215 tonnes) equal total inflows from transfers (215 tonnes), maintaining mass conservation. Column arithmetic: for each compartment, opening stock + total inflows – total outflows = closing stock. The “import via ocean transport” row records transboundary litter flows arriving via ocean currents. Receiving-coastline countries (e.g., Pacific island states in North Pacific Gyre currents) should populate this row to distinguish externally-sourced accumulation from domestic inputs (see Section 3.5).

¶4 **Note on terminal sinks:** The seabed compartment is treated as a terminal sink, with no resuspension or redistribution from seabed to other compartments recorded. Where monitoring data indicate significant resuspension (e.g., in high-energy shallow-water environments), compilers should add a transfer outflow row for the seabed compartment and a corresponding inflow row for the water column.

Monitoring methods by compartment

¶1 The accounting compartments correspond to distinct sampling problems, and the appropriate protocol differs for each. The mapping below follows the IUCN Global Ecosystem Typology so that litter monitoring aligns with the spatial units used for ecosystem accounting³⁹.

Compartment	IUCN GET unit	Sampling and monitoring methods	Principal protocols
Beach and coastal	MT1 shorelines; MT2 supralittoral coastal; MT3 anthropogenic shorelines	Transect or quadrat surveys; sieving for buried macro-litter in the top 5–10 cm; sediment cores; aerial and remote sensing	OSPAR beach litter guideline; NOAA marine debris monitoring protocols and field datasheets; UNEP/IOC (2009); European Commission (2023); AMDI monitoring protocols
Floating and water column	M2 pelagic ocean waters	Net tows; visual observation and photographic survey from vessels; water sampling; submersible pumps to known depth; remote sensing	GESAMP (2019); UNEP (2021) global manual on measuring SDG 14.1.1
Seafloor	M3 deep sea floors; M1 marine shelf	Trawling; towed video and ROV transects; sediment cores; acoustic methods (sonar, side imaging) to locate accumulation points; diver survey above 30 m	GESAMP (2019); EMODnet; European Commission (2023); JAMSTEC Deep-sea Debris Database
Estuarine and transitional	FM1 semi-confined transitional waters	Shoreline transects and quadrats; surface water sampling; sediment cores; remote sensing	UNEP (2020) rivers and lakes guidelines; GESAMP (2019); OSPAR
Artificial marine structures	M4 anthropogenic or artificial marine	Underwater survey for debris and entanglement; aerial and remote sensing	No compartment-specific protocol existed as of 2025; marine protocols are adapted, and the adaptation documented

¶2 Sampling in pelagic waters requires specialist and costly platforms. The recommended practice is to acquire these observations opportunistically – during biodiversity surveys, oceanographic research cruises, fisheries assessments, or offshore engineering and exploration missions – rather than commissioning dedicated survey effort that a national programme is unlikely to sustain³⁹. Compilers should record the survey platform alongside each estimate, because opportunistic sampling carries spatial biases that a dedicated design would avoid.

¶3 **Remote sensing.** Satellite imagery, drone survey, thermal imaging, multispectral analysis, LiDAR volume estimation and fixed monitoring cameras each address a different part of the detection problem, and openly available imagery libraries make several of them inexpensive⁴⁰. Two constraints govern their use in accounts. Detection must be converted to quantity through a validated model, and results must be ground-truthed at selected locations before they enter the account; without that step remote sensing yields extent, not mass. Resolution, cloud cover and seasonality all interrupt time series, so acquisition conditions should be documented for each period. Thermal imagery additionally detects the heat signatures of active open burning, linking this method to the burning estimator in Section 3.3.

Beach and coastal stocks

¶1 Beach litter is the most accessible stock for monitoring, with established survey methodologies⁴¹. Stock accounts record mass or item counts per unit area (beach length, surface area), aggregated to total coastal stock and disaggregated by material category.

¶2 Beach stock accounts recognise that beaches are dynamic interfaces:

- ¶3 New litter deposits during each tidal cycle and storm event
- ¶4 Removal occurs through clean-up activities, burial, and resuspension
- ¶5 Opening and closing stocks relate through: Closing stock = Opening stock + Deposits - Removals - Degradation

¶6 Clean-up activities should be recorded as economic flows (environmental protection expenditure under CEPA 3) and their effect on beach stocks quantified⁴². This links to environmental expenditure accounts in **TG-3.7 Governance Accounts**.

Floating litter stocks

¶1 Surface and near-surface floating litter is measured through visual surveys, net tows, or remote sensing. SDG indicator 14.1.1 specifies floating plastic debris density as a monitoring parameter⁴³. Stock accounts for floating litter face specific challenges:

- ¶2 Dynamic distribution influenced by currents, winds, and convergence zones
- ¶3 Variable vertical distribution (surface to depth)
- ¶4 Difficulty in scaling point observations to total stock estimates

¶5 Global accumulation zones (ocean gyres) represent areas of elevated floating debris concentration. Stock accounts may record density estimates (items or mass per km²) for defined ocean areas, total estimated stock based on density and area, and uncertainty ranges. Litter density may also serve as an ecosystem condition indicator. The relationship between accumulation and ecosystem condition is addressed in **TG-2.1 Biophysical Indicators**.

Water column stocks

¶1 Litter suspended in the water column is less well characterised than surface or benthic stocks. Accounting approaches are necessarily more experimental and may rely on depth-stratified sampling data, modelled vertical distribution based on particle characteristics, or extrapolation from limited survey data.

Seafloor stocks

¶1 Benthic litter accumulates on the seabed, particularly in areas of high sedimentation, submarine canyons, and deep-sea plains. Monitoring uses trawl surveys, remotely operated vehicle (ROV) transects, and baited camera systems. Stock accounts should record density by seabed type and depth zone, estimated total stock within national waters, and composition by material category. The SEEA EA addresses ecosystem condition, including pollutant presence as a condition variable⁴⁴.

3.5 Source Attribution and Material Flow Accounts

¶1 Effective marine litter policy requires attribution of litter to the economic units and locations responsible for its generation. The SEEA CF principle of recording residual flows by source industry applies⁴⁵.

Industry source attribution

¶1 Industry sources of marine litter, classified by ISIC:

Sector	ISIC	Marine litter nexus
Plastic resin/product manufacture	20, 22	Production waste, pellet losses
Food, beverage, tobacco	10-12	Packaging waste

Sector	ISIC	Marine litter nexus
Textiles and apparel	13-14	Microfibre release
Marine fishing	0311	Fishing gear losses, operational waste
Marine aquaculture	0321	Equipment losses, feed bags
Water transport	50	Vessel waste, cargo losses
Accommodation and food service	55-56	Disposable items, packaging
Waste management	38	Leakage from collection and disposal

¶2 Where direct industry-level data on marine litter contributions are unavailable, compilers may use waste composition data from beach litter surveys to attribute litter to source industries through product-to-industry concordances. For example, packaging items in beach surveys can be mapped to the manufacturing industry that produced them (ISIC 10-12 for food packaging) and to the retail or hospitality industry that distributed them (ISIC 47, 55-56). Detailed guidance on industry classification is in **TG-3.3 Economic Activity**.

Household source attribution

¶1 Households are major sources of marine litter through consumer product disposal, littering, inadequate waste storage, and microplastic releases (laundry, personal care products). Household marine litter is recorded in the household sector column of the physical supply table.

Informal sector attribution

¶1 The informal collection and recovery sector is a recovery pathway rather than a source, and misplacing it distorts both the collected column and the mismanaged residual. It is also the hardest segment to enumerate: operations are irregular, records are rarely kept, and engagement depends on trust that a statistical exercise cannot assume⁴⁶. The practical attribution routes are cooperative-level reporting of recovered volumes by material type, market price data from itinerant buyers and aggregators, and recycler input records traced back to supply channel. Where the sector is enumerated, the corresponding employment and livelihood data should be captured in the same exercise (Section 3.7).

Geographic allocation

¶1 **Coastal zone delineation** – Coastal zone definitions should align with administrative boundaries whilst recognising functional connectivity to marine waters⁴⁷. See **TG-1.2 Marine Spatial Planning**.

¶2 **Catchment-based accounting** – River catchments as accounting units enable tracking of riverine litter pathways.

¶3 **Maritime zone accounting** – Recording of sea-based source litter by location (territorial sea, EEZ, high seas) supports jurisdictional analysis.

¶4 **Transboundary litter flows**. Litter originating in foreign jurisdictions and transported by ocean currents should be recorded separately in physical flow accounts using the “import via ocean transport” row in Table 3.4.1. Failure to do so will distort domestic source attribution. The three principal estimation approaches are: (a) ocean debris transport modelling (using circulation models to back-calculate probable source regions); (b) source-marker or polymer-signature analysis (comparing polymer types and additive profiles to known source regions); and (c) branded-product origin analysis from beach surveys. Each approach carries substantial uncertainty, so transboundary import estimates should always be reported with a sensitivity range and a method tag. Attribution of transboundary litter to source countries requires international coordination through regional seas conventions (e.g., SPREP for the Pacific)⁴⁸. For SDG 14.1.1 reporting, domestic source attribution takes precedence, and transboundary flows should be reported as supplementary information.

¶5 The SEEA CF supports sub-national disaggregation where data permit⁴⁹. Priority geographic units include coastal municipalities, river catchments with marine outlets, port areas and shipping lanes, and marine protected areas.

3.6 Material Flow Account for Synthetic Marine Litter: Worked Example

¶1 This section presents a worked example tracking plastics from production through consumption, waste generation, collection and treatment, to marine leakage.

¶2 The procedure is a material flow analysis: a systematic quantification of the flows and stocks of a material within a defined system boundary over a defined period, closed by mass balance⁵⁰. Stated formally it has five stages – system definition (geographical and temporal boundaries, processes and actors), data collection, flow quantification, balance calculation, and visualisation and interpretation. The balance stage is what converts a collection of unrelated statistics into an account: an unexplained residual is either a real stock change or a data error, and the analysis must say which.

¶3 National precedents exist and are worth consulting before designing a first compilation. Sri Lanka's national plastic waste inventory (2024) and Statistics Norway's plastic account are the closest analogues to the procedure below, both built as national-scale material flow analyses; the Netherlands, Germany (healthcare sector), Australia, New Zealand, and a four-country South-East Asian study through the ERIA Regional Knowledge Centre on Marine Plastic Debris provide further worked national and sectoral examples⁵¹.

Compilation procedure overview

1. ¶1 **Identify synthetic material production and imports** – from industrial production statistics and trade data
2. ¶2 **Estimate synthetic material consumption** – using supply-use balancing (domestic production + imports – exports)
3. ¶3 **Record waste generation by sector** – from waste surveys and composition studies
4. ¶4 **Estimate waste collection and treatment** – from municipal and industrial waste management records
5. ¶5 **Model mismanaged waste** – as the difference between waste generated and waste formally collected
6. ¶6 **Estimate marine leakage** – applying leakage factors to mismanaged waste based on proximity to marine environment

Step 1: Synthetic material production and imports

¶1 From industrial production statistics (ISIC 20.16 and 22.20) and customs trade data (HS 3901-3914 for primary forms, 3916-3926 for products, and 3915 for waste and scrap; HS chapters 54 and 55 additionally cover the man-made filaments and staple fibres relevant to synthetic textiles):

Flow	Quantity (tonnes)	Source
Domestic production of plastic resins	125,000	Industrial census
Imports of plastic products	68,000	Trade statistics
Exports of plastic products	42,000	Trade statistics
Net supply to domestic economy	151,000	Calculated

Step 2: Synthetic material consumption by sector

Consuming Sector	ISIC	Quantity (tonnes)	Share (%)
Food & beverage manufacturing	10-11	35,000	23.2
Retail trade (packaging)	47	28,000	18.5

Consuming Sector	ISIC	Quantity (tonnes)	Share (%)
Accommodation & food service	55-56	18,000	11.9
Fishing	0311	12,000	7.9
Construction	41-43	15,000	9.9
Households (direct consumption)	HH	38,000	25.2
Other industries	Various	5,000	3.3
Total consumption		151,000	100.0

Step 3: Waste generation

Waste Source	ISIC/Sector	Waste Generated (tonnes)	Plastic Content (%)	Plastic Waste (tonnes)
Food manufacturing	10-11	45,000	60	27,000
Retail & hospitality	47, 55-56	38,000	55	20,900
Fishing	0311	15,000	75	11,250
Construction	41-43	22,000	40	8,800
Households	HH	95,000	35	33,250
Other industries	Various	12,000	30	3,600
Total waste generated		227,000	–	104,800

¶1 **Material balance closure.** The 46,200-tonne difference between consumption (151,000 tonnes) and waste generation (104,800 tonnes) represents the net addition to the stock of plastic products in use (durable goods with remaining service life), together with minor losses from degradation during the use phase. The SEEA CF material balance principle requires that all material inputs be accounted for in outputs, stock changes, or dissipative losses. This in-use stock change should be recorded in a separate physical balance sheet:

Opening stock of plastic products in use
+ Consumption
– Waste generation
– Use-phase dissipative losses
= Closing stock of plastic products in use

¶2 The collected-for-recycling rate is calculated against waste generated, not total consumption: $18,500 / 104,800 = 17.7\%$. It is a collection rate, not a recycling rate (see the measurement-point note in Step 4). Compilers should clearly state the denominator when reporting recycling rates to ensure comparability with international reporting.

Step 4: Waste collection and treatment

Treatment Pathway	Quantity (tonnes)	Share (%)
Collected for recycling	18,500	17.7
Collected for incineration	12,300	11.7
Collected for controlled landfill	48,200	46.0
Total formally collected	79,000	75.4
Mismanaged waste	25,800	24.6
Total waste generated	104,800	100.0

¶1 **Measurement point of the treatment figures.** The rows above are collection figures, measured at the point of collection and before sorting, and they therefore include contamination and

material that will be rejected downstream. The 18,500 tonnes collected for recycling is not the tonnage recycled. The recycling rate international reporting expects is built on **recovered tonnes**: material that completes the recycling process and leaves the facility as saleable recycle¹⁵. Compilers holding both figures should report the recovered-tonnes rate as the headline and the collected-for-recycling rate as a supplementary measure of collection performance, stating the measurement point for each; the gap between them is itself a useful indicator of sorting loss. Where only collection data exist, the rate must be labelled a collection rate and not a recycling rate. Facility-level reject and residual waste tonnages, where reported, close the difference.

Step 5: Mismanaged waste estimation

Geographic Zone	Mismanaged Waste (tonnes)	Share (%)
Coastal zone (<50km from coast)	14,800	57.4
Inland zone (>50km from coast)	11,000	42.6
Total mismanaged	25,800	100.0

Step 6: Marine leakage estimation

¶1 Apply Jambeck et al. (2015) leakage factors as defined in Section 3.3. The values below are illustrative central estimates. Compilers should calibrate factors to national monitoring data or published country-level estimates where available.

Source Category	Mismanaged Waste (tonnes)	Leakage Factor (central)	Sensitivity Range (low –high)	Marine Leakage (tonnes)	Source basis
Coastal zone land-based	14,800	0.25	0.15 – 0.40	3,700	Jambeck et al. (2015), range from inadequately managed waste estimates ²⁵
Inland (via riverine transport)	11,000	0.08	0.02 – 0.15	880	Lebreton et al. (2017) riverine emission rates ²² ; Lau et al. (2020) sensitivity ²⁶
Fishing gear losses (direct)	1,200	1.00	0.80 – 1.00	1,200	Richardson et al. (2019) ³⁵ ; gear losses assumed to enter marine environment directly
Maritime operational waste	450	0.60	0.10 – 0.60	270	Assumption pending peer review; see note below
Total marine litter input				6,050	

¶2 **Note on the maritime operational waste factor.** MARPOL Annex V requires all ships to deliver garbage to port reception facilities (PRFs) before discharge, with compliance monitored through Garbage Record Books and Port State Control (PSC) inspections. The 0.60 central value is an upper-bound assumption that does not reflect MARPOL Annex V compliance rates and should be replaced with a country-specific estimate based on PRF utilisation data (IMO GISIS database) and PSC inspection statistics. Where empirical national data are unavailable, compilers should report a sensitivity range rather than a single point estimate and flag the assumption as requiring expert peer review.

¶3 Compilers should (1) cite the source for each leakage factor used, (2) report a low–high sensitivity range alongside the central estimate, (3) calibrate factors to national monitoring data where these exist, and (4) document any departures from published source–methodology values.

Interpretation

- ¶1 **Collection gap:** 24.6% of plastic waste is mismanaged, representing the primary intervention target
- ¶2 **Coastal concentration:** 57% of mismanaged waste is in coastal zones where leakage probability is highest (25% vs 8% for inland)
- ¶3 **Sector priorities:** Fishing, retail/hospitality, and households together account for 62% of total plastic waste generation
- ¶4 **Marine leakage rate:** land-based marine litter input $(3,700 + 880 = 4,580 \text{ tonnes}) / 104,800 = 4.4\%$ of plastic waste generated ultimately enters marine environment. Fishing gear losses and maritime operational waste (1,470 tonnes) are not in the waste-generation denominator and are reported separately; total marine litter input is 6,050 tonnes

¶5 Policy implications:

- ¶6 Expanding waste collection coverage in coastal zones from 75% to 85% (assuming the coastal zone shares the national collection rate of about 75%) would reduce coastal mismanaged waste by an estimated 5,920 tonnes and marine leakage from this source by an estimated 1,480 tonnes annually
- ¶7 Extended producer responsibility for packaging (ISIC 10-11, 47) could address approximately 48,000 tonnes of plastic waste at source
- ¶8 Fishing gear deposit-return schemes could recover a portion of the 1,200 tonnes of gear losses

¶9 Quality assurance for this worked example is addressed in **TG-0.7 Quality Assurance**.

3.7 What the Accounts Supply to Indicator Reporting

¶1 **SDG 14.1.1 is derived in TG-2.7 Pollution and Other Flows to Environment Section 3.5, and its MEA reporting route in TG-2.10⁵², ⁵³**. Neither the indicator definition, the sub-indicator structure nor the composite construction is restated here. This Section states only what the litter accounts must supply so that the indicator can be built from them without a parallel data collection.

What the account has to carry

¶1 **Floating plastic debris density** – the sub-indicator this Circular feeds – is reported as items or mass per square kilometre of sea surface. The stock accounts at Section 3.4 must therefore carry the surveyed area alongside the count or mass, in the compartment the indicator expects (sea surface, not beach or seafloor), and at a temporal reference matching the reporting year. An account that records national totals without the denominator cannot supply the indicator.

¶2 **Index of coastal eutrophication (ICEP)** is the other sub-indicator and is outside this Circular; nutrient accounting is at **TG-3.4 Flows from Economy to Environment** and **TG-6.13** Section 3.2. The two sub-indicators are reported in parallel rather than combined, so the practical requirement on a compiler running both is that the spatial and temporal reference units match; where a country's litter surveys and nutrient monitoring use different coastal segmentations, reconciling them is the work that has to be scheduled.

Multi-target linkages

- ¶1 **SDG 12.4** (Environmentally sound management of wastes) – Marine litter flow accounts quantify waste escaping management systems.

- ¶2 **SDG 12.5** (Reduce waste generation) – Time-series accounts track progress in material circularity as reflected in declining leakage rates.
- ¶3 **SDG 6.3** (Improve water quality) – Riverine litter transport estimates link land-based pollution to downstream marine impacts.

Social and just-transition indicators

¶1 Marine litter accounts describe a workforce as well as a material, and the plastics data system that produces them can carry social indicators at marginal additional cost. Employment across the value chain (production, collection, sorting, recycling, administration) with demographic breakdown; formal against informal participation rates; income levels compared with regional living wage standards; working hours and occupational injury and illness rates; and community awareness and participation in collection are all collectable through the same household and workforce surveys that generate waste composition and disposal-behaviour data⁵⁴. These indicators support SDG 1, 3, 5, 8, 10, 11 and 12, and they are the evidence base for a just transition in waste management – a question that arises directly whenever an account identifies informal recovery as a material part of the collection system (Section 3.5).

¶2 The multi-indicator framework for deriving ocean policy indicators is addressed in **TG-2.7**

Pollution Flows.

Indicator derivation from accounts

Indicator	Calculation	Unit
Litter generation intensity	Litter generated / GDP	Tonnes per million USD
Per capita litter generation	Litter generated / Coastal population	kg per capita
Mismanaged waste rate	Mismanaged waste / Total waste generated	Percent
Marine leakage rate	Land-based litter to ocean / Total waste generated	Percent
Fishing gear loss rate	ALDFG mass / Active gear mass	Percent
Beach litter accumulation	Beach stock change / Coastline length	Items per km
Clean-up effectiveness	Removed litter / Beach stock	Percent

¶1 Guidance on indicator derivation and interpretation is in **TG-2.7 Pollution Flows**.

4. Data Sources and Compilation

¶1 Compilation of marine litter and plastics accounts draws on multiple data sources. General guidance on data collection methods is in **TG-4.1 Remote Sensing and Geospatial Data**, **TG-4.2 Survey Methods for Ocean Economic Activity**, and **TG-4.4 Citizen Science and Community-Based Monitoring**. Administrative data sources are addressed in **TG-4.3 Administrative Data**.

¶2 Key data sources include:

¶3 **Waste management statistics** – National waste statistics and composition surveys, municipal solid waste data, recycling and recovery rates by material type, and industrial waste reporting.

¶4 **Environmental monitoring programmes** – Beach litter surveys (national programmes, OSPAR, HELCOM, regional seas conventions); marine litter monitoring; microplastics monitoring; citizen science and clean-up organisation data.

¶5 **Maritime and fisheries data** – Port reception facility records (MARPOL Annex V), fishing gear inventories and loss reporting, maritime incident databases, and vessel tracking data (AIS).

¶6 **Economic statistics** – Industry production data for plastic-intensive sectors, trade data for plastic products, and tourism statistics.

¶7 **Modelling and estimation** – Waste leakage models (Jambeck methodology and derivatives), river transport models, ocean circulation and debris transport models, and fragmentation and degradation models.

¶8 **International reporting** – UNEP marine litter databases, regional seas convention assessments, and Global Partnership on Marine Litter data.

Named platforms and repositories

¶1 The repositories below should be checked before any new collection is commissioned.

Several hold country-level data that a national programme has itself reported and may not know is retrievable.

Source	Coverage
Global Plastics Data Tracker (GOAP / CSDR)	Availability of government-reported plastics data for every UN Member State, from production to environmental release; each data point scored 1–5 for reliability, downloadable as a per-country checklist ¹¹
GPML Digital Platform (UNEP)	Country dashboards of plastic flow data, policy tracking, and consolidated global datasets spanning the economy, waste and the environment
What a Waste 2.0 (World Bank)	Waste generation, composition, collection, treatment and disposal for 217 countries and 367 cities, with projections
UN Comtrade; UNCTADstat; Comext (Eurostat)	Trade in primary plastics, products and waste by HS and SITC code
PRODCOM (Eurostat); UN Industrial Commodity Statistics Database	Industrial production of primary forms and plastic products
Eurostat waste statistics; Basel Convention national reporting; UNFCCC national inventories	Waste generation and treatment; transboundary plastic waste movements; waste composition compiled for emissions inventories
OSPAR Beach Litter Database; HELCOM Marine Litter Database; EMODnet	Regional beach, seafloor and sea-surface litter, with harmonised protocols and endorsed datasets
NOAA Marine Debris Monitoring and Assessment Project; Japanese marine plastic monitoring	National shoreline monitoring protocols, field datasheets and time series
JAMSTEC Deep-sea Debris Database	Seafloor imagery from the Pacific, Indian and Atlantic Oceans since 1983
LITTERBASE (Alfred Wegener Institute)	Synthesised global litter distribution and litter-organism interaction data
AMD Database (Tangaroa Blue); Marine Debris Tracker; Litterati; International Coastal Cleanup	Citizen science and clean-up data, item-level and geolocated; AMDI is the largest southern hemisphere marine debris dataset, running since 2004
The Ocean Cleanup research	Modelled and observed floating debris distribution

¶2 Methodological guidance to pair with these sources: GESAMP (2019) for ocean plastic litter monitoring; UNEP (2021) *Understanding the State of the Ocean* for SDG 14.1.1, 14.2.1 and 14.5.1 measurement; UNEP/IOC (2009) for beach, benthic and floating litter surveys; UNEP (2020) for rivers and lakes; UNEP/IUCN national guidance on plastic pollution hotspotting; the IUCN marine plastic footprint methodology for leakage at the waste stage; and the European Commission's 2023 guidance on monitoring marine litter in European seas⁹. The GPML Community of Practice on Harmonisation of Monitoring and Assessment of Plastic Pollution is the forum in which the interoperability of these methods is being worked out, and compilers with unresolved comparability problems should raise them there rather than resolving them privately.

Assessing what the country already has

¶1 Score what exists before generating anything new. Two independent scales apply to every data point, and the pairing matters: data can be available but unreliable, and a reliable one-off study is not a usable account input⁵⁵.

¶2 *Availability:*

Rating	Meaning
Green	Comprehensive national coverage, collected periodically, publicly available
Amber	Limited spatial or temporal resolution, restricted to particular sectors, or difficult to access consistently
Red	No data, or data that cannot measure plastic-relevant flows

¶3 *Reliability:*

Rating	Meaning
High	Nationally representative, from empirical and scientifically sound methods
Medium	Partially representative; or balanced from corresponding inputs and outputs; or using composition estimates borrowed from other regions or countries
Low	Limited representativeness or methodological rigour; derived from proxies such as monetary equivalence

¶4 Applying these scales to the entries this Circular requires yields the honest statement of account quality on which the sensitivity ranges in Section 3.6 depend. A marine leakage estimate built on medium-reliability composition data and default leakage factors should be published with that provenance visible rather than as a point estimate.

Prioritising which gaps to close

¶1 Not every gap is worth closing, and the cheapest are rarely the most useful. Score each data category on four dimensions and prioritise the lowest total, so that low availability, low reliability, easy remedy and high impact all pull in the same direction⁵⁶:

Dimension	Scores
Availability	Available 4; partially available 2; not available 0
Reliability	High 2; medium 1; low 0
Expected ease of filling the gap	Challenging 3; moderate 2; easy 1
Impact of filling the gap	Low 3; medium 2; high 1

¶2 Ease and impact are judgements rather than measurements and should be drawn from the stakeholders identified below, not assigned by the compiling agency alone. The same technique settles which plastics to cover first: wholly plastic products are easier to measure than composites, and high-volume or policy-salient streams repay measurement sooner. A completed prioritisation should be validated through expert review, stakeholder consultation, cross-reference to national policy objectives and international commitments, and a final check of available resources against ambition⁵⁶.

Data quality issues by category

¶1 Each category fails in characteristic ways, and the countermeasures are known⁵⁷:

Category	Characteristic quality issues	Countermeasures
Production	Reporting lags; small producers missing	Cross-check national against international databases; compare with installed capacity; validate against trade flows

Category	Characteristic quality issues	Countermeasures
Consumption	Apparent consumption misses stockpiling; informal market activity invisible	Cross-validate apparent consumption against market surveys and industry reports; check consistency against waste generation
Trade	Small shipments below reporting thresholds; plastic waste trade poorly recorded; partner countries reporting differently; low-value flows estimated rather than measured	Compare mirror statistics between trading partners; cross-validate national against international databases; check thresholds and exemptions
Waste	Informal sector activity not captured; mixed streams difficult to characterise; inconsistent measurement between jurisdictions	Compare against consumption data; cross-check between successive stages of the waste chain; validate against extended producer responsibility collection data

¶12 Verification of any individual figure follows four steps: check the definition in use; cross-validate against an independent source; account for double-counting wherever the method sums across sources; and confirm that assumptions and conversion factors are listed, evidence-based and referenced⁵⁷.

Reconciling inconsistent data

¶11 Divergent figures for the same quantity are the normal condition rather than an exception, and the account must resolve them visibly. Establish a hierarchy of data reliability with a designated primary source for each category and a protocol governing when a secondary source may override it. Triangulate across independent sources, and document rather than suppress the discrepancies. Where a figure is missing, bound it: establish upper and lower values, run a sensitivity analysis, and state the confidence level. Proxy measurement (economic indicators, plastic-to-product weight ratios, data from comparable economies), statistical modelling and step-down scaling from national to sub-national estimates are all legitimate provided the derivation is recorded. Standardised templates, conversion tools between classification systems, automated validation at the point of data entry, and expert review panels for persistently problematic figures are the institutional means of holding this together⁵⁸. Every reconciliation decision belongs in the metadata with its rationale.

¶12 Units follow a single convention: tonnes or kilotonnes for absolute quantities, and kilograms per capita for cross-country comparison. Each data point carries at minimum its weight, reference year and source, and wherever possible its polymer type, the industry of consumption or disposal, and the assumptions and conversion factors used to derive it⁵⁹.

Institutional arrangements

¶11 The generic institutional readiness framework – the mandate questions, the lead-agency choice, the coordination architecture and the readiness self-assessment – is set out in **TG-0.8 Implementation Readiness Assessment** Sections 3.1 and 3.5, and in **TG-4.7 National Data Coordination Architectures**. It is not restated here. What follows is what is specific to a plastics account.

¶12 None of the above survives a change of government or a staff departure unless it is somebody's job. Securing the institutional foundation precedes stakeholder engagement, because an agency without a mandate cannot compel data provision, and coordination without a designated lead fragments⁶⁰. Four questions settle the arrangement: which agencies already hold legal authority to collect plastics-related data; which is best placed to lead, typically the environment ministry, the national statistical office or the waste management authority; what each agency already collects that could be reused rather than duplicated (customs for trade, industry ministries for production, municipalities for waste); and what inter-agency data-sharing protocols exist, with what formats, timelines, quality assurance procedures and named contact points.

¶3 Stakeholder mapping proceeds in three phases: desktop research across agencies, trade data-bases, business registries, waste service providers, NGOs and research institutions; initial consultations to validate the list and begin building relationships; and snowball identification in which each stakeholder names others, the stage that surfaces the informal sector and other actors absent from registries⁶¹. The resulting arrangement is best expressed as an action matrix stating, for each stakeholder, the lifecycle stage covered, the data to be provided, the reporting frequency, the path the data travels, and the support required. Indicative frequencies run monthly for customs and municipal collection records, quarterly for producers, recyclers and the coordinating agencies, and annually for survey-based consumption and research inputs.

¶4 The obstacles are predictable and should be planned for rather than discovered: institutional and sectoral data silos; overlapping or conflicting mandates; commercial confidentiality; political sensitivity around waste generation rates and illegal dumping; limited technical capacity; interoperability between systems; and the difficulty of sustaining engagement and funding beyond a pilot phase⁶¹.

Embedding the account in legislation and practice

¶1 An account is repeatable when the obligation to produce it is written down. Legislative frameworks should establish which agency is responsible for what; set reporting thresholds, frequencies and deadlines; specify verification procedures and consequences for non-compliance; protect commercial sensitivity while allowing publication of aggregates; and align with international commitments, including the instrument under negotiation on plastic pollution⁶². Precedents include the EU Packaging and Packaging Waste Directive (94/62/EC, as amended) together with the 2019 Single-Use Plastics Directive, which mandate material-specific packaging waste reporting; South Korea's 2003 Act on the Promotion of Saving and Recycling of Resources, whose extended producer responsibility system produces one of the most detailed national plastics datasets; and the 2022 amendments to the Canadian Environmental Protection Act, which created a national plastics registry with threshold-based reporting by manufacturers, importers and users⁶².

¶2 Three supporting practices keep a standing account functioning⁶³. Continuing engagement, through multi-stakeholder advisory committees, industry working groups on sector-specific measurement problems, and user forums that keep the statistics useful – the Australian Packaging Covenant Organisation and the UK Plastics Pact are working models. Continuing capacity development, through training in collection and validation methods, documented standard operating procedures, knowledge transfer between senior and incoming staff, and research partnerships; Eurostat's European Statistical Training Programme offers modules on plastic waste characterisation and material flow accounting. And digitalisation: secure online reporting in place of paper submission, automated validation at the point of entry, application programming interfaces transferring data directly from company systems, integration with customs data and business registries to reduce reporting burden, and mobile tools for field waste characterisation. Germany's LUCID packaging register is an operating example of the reporting-platform pattern. Dedicated funding can be sought through environmental fees on plastic products, earmarked allocations from waste management budgets, or international financing for plastic pollution and circular economy work.

Compilation pathways and phased implementation

¶1 **Phase 1: Foundation** – Beach litter survey data are the most widely available starting point. Countries with established beach monitoring programmes (OSPAR, HELCOM, or national programmes) can compile initial stock accounts for coastal compartments and use survey composition data to estimate source attribution.

¶2 **Phase 2: Flow estimation** – Building on waste management statistics, compilers estimate land-based litter flows using the Jambeck methodology. Maritime source flows are estimated from fisheries and port data using the physical supply and use table framework (Section 3.3).

¶3 **Phase 3: Full accounts** – Integration of floating and benthic stock data and refined geographic disaggregation produces complete stock-flow accounts. This phase requires investment in monitoring infrastructure and modelling capacity.

¶4 These three phases describe the widening coverage of the litter account specifically, and sit inside the general phased implementation pathway at **TG-0.8** Section 3.2 rather than replacing it. They are also orthogonal to the maturity ladder set out at the start of Section 3: a Phase 1 compilation repeated annually under a documented methodology is already an account, whereas a Phase 3 compilation produced once is an inventory entry. Countries should secure repeatability at whatever coverage they can sustain before extending coverage, because a broken time series cannot be repaired retrospectively.

¶5 Data gap assessment and prioritisation guidance is in **TG-4.6 Data Harmonisation**. Quality assurance considerations are addressed in **TG-0.7 Quality Assurance**.

5. Acknowledgements

¶1 **Authors:** [To be confirmed]

¶2 **Reviewers:** [To be confirmed]

6. References and Further Reading

¶1 This Circular should be read in conjunction with:

- ¶2 SEEA Central Framework, Chapter III: Physical flow accounts, particularly section 3.6.5 on solid waste accounts⁶⁴
- ¶3 GESAMP (2019). Guidelines for the monitoring and assessment of plastic litter in the ocean
- ¶4 UNEP (2021). From Pollution to Solution: A Global Assessment of Marine Litter and Plastic Pollution
- ¶5 SDG Framework, Target 14.1 and Indicator 14.1.1 methodology
- ¶6 Regional seas convention marine litter monitoring protocols (OSPAR, HELCOM, Barcelona Convention, NOWPAP)
- ¶7 TNFD disclosure recommendations for waste and pollution metrics⁶⁵
- ¶8 Lau, W.W.Y. et al. (2020). Evaluating scenarios toward zero plastic pollution. *Science*
- ¶9 Borrelle, S.B. et al. (2020). Predicted growth in plastic waste exceeds efforts to mitigate plastic pollution. *Science*
- ¶10 SPREP (2018). Pacific Regional Action Plan: Marine Litter 2018-2025. Secretariat of the Pacific Regional Environment Programme.
- ¶11 ISO 18830:2016 and ISO 19679:2016, Marine biodegradability test methods for plastic materials.
- ¶12 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook – the operational companion to this Circular.
- ¶13 UNEP (2021). Understanding the State of the Ocean: A Global Manual on Measuring SDG 14.1.1, SDG 14.2.1 and SDG 14.5.1.
- ¶14 UNEP / IOC (2009). Guidelines on Survey and Monitoring of Marine Litter.
- ¶15 UNEP (2020). Monitoring Plastics in Rivers and Lakes: Guidelines for the Harmonisation of Methodologies.
- ¶16 UNEP / IUCN. National Guidance for Plastic Pollution Hotspotting and Shaping Action; and IUCN, The Marine Plastic Footprint.

- ¶17 IPCC (2006). Guidelines for National Greenhouse Gas Inventories, Volume 5 Chapter 5: Incineration and Open Burning of Waste; and the 2019 Refinement, Volume 5 Chapter 2: Waste Generation, Composition and Management Data.
- ¶18 World Bank (2018). What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050.
- ¶19 European Commission (2023). Guidance on Monitoring of Marine Litter in European Seas, MSFD Technical Group on Marine Litter.

FOOTNOTES

1. ¶1 UNEP (2021). From Pollution to Solution: A Global Assessment of Marine Litter and Plastic Pollution. Nairobi: UNEP, p. 10.
2. ¶2 GESAMP (2019). Guidelines for the Monitoring and Assessment of Plastic Litter in the Ocean, paragraph 2.1.
3. ¶3 United Nations (2015). Transforming our world: the 2030 Agenda for Sustainable Development. A/RES/70/1, Target 14.1.
4. ¶4 UN Statistics Division. SDG Indicator 14.1.1: Index of coastal eutrophication and floating plastic debris density. Metadata document.
5. ¶5 UNEP (2022). Resolution adopted by the United Nations Environment Assembly on 2 March 2022: End plastic pollution: towards an international legally binding instrument. UNEP/EA.5/Res.14.
6. ¶6 UNEP Intergovernmental Negotiating Committee on Plastic Pollution. Live status page: <https://www.unep.org/inc-plastic-pollution> (<https://www.unep.org/inc-plastic-pollution>). Compilers should consult this page for the current state of negotiations and any adopted reporting obligations.
7. ¶7 SEEA CF, paragraph 3.84. This aligns with the concept of waste in EU Directive 2008/98/EC Article 3(1).
8. ¶8 SEEA CF, paragraphs 3.268–3.278 and Table 3.18.
9. ¶9 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook. Draft of 10 November 2025, prepared with funding from the UK Blue Planet Fund. The Handbook was in preparation at the time this Circular was issued; compilers should check for the published version, whose section numbering may differ from the draft cited here. Its Annex 2 is the consolidated catalogue of the data sources named in this Section, and its Annex 5 the catalogue of sampling methods by environmental realm.
10. ¶10 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, Introduction (“Objectives”) and Step 6, section 6.1. The three-level sequence is data points, then a plastics data inventory, then plastics accounts, the last requiring periodic publication under a standardised methodology.
11. ¶11 UNSW Centre for Sustainable Development Reform (2025). Global Plastics Data Tracker, <https://plastictracker.org> (<https://plastictracker.org>). The Tracker records the availability of government-reported plastics data for every UN Member State and scores each data point from 1 to 5 for reliability, the higher scores going to data published annually with plastic-specific breakdowns. The 10 percent and 60 percent figures are the review’s own findings as reported in the Handbook’s Introduction. The Tracker was compiled through a rapid review and is not exhaustive, so it should be used alongside, not instead of, the repositories listed in Section 4.
12. ¶12 SEEA CF, paragraphs 3.268–3.278. Paragraph 3.268 describes solid waste accounts as “useful in organizing information on the generation of solid waste and the management of flows of solid waste to recycling facilities, to controlled landfills or directly to the environment.”
13. ¶13 UN Statistics Division. SDG Indicator 14.1.1 Metadata.
14. ¶14 UNEP (2024), assessment of plastics definitions, as tabulated in GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, Annex 3 (Waste Management Terminology Comparison). Attributions in the table are to the UNEP/IUCN Hotspotting methodology and PLASTEAX, the OECD, GIZ’s Waste Flow Diagram, and UN-Habitat’s Waste Wise Cities Tool. The fly-tipping definition follows Boucher et al. (2020); the littering definition follows Velis et al. (2017).
15. ¶15 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, Step 1 (“Waste Data”) and Annex 1 (Key Definitions). The distinction between waste generated, collected and treated turns on the measurement point in the chain; “recovered tonnes” is measured after sorting and processing, when the material has become recyclate saleable to an end market.
16. ¶16 GESAMP (2019). Guidelines for the Monitoring and Assessment of Plastic Litter in the Ocean. IMO/FAO/UNESCO-IOC/UNIDO/WMO/IAEA/UN/UNEP/UNDP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection.
17. ¶17 European Commission (2010). Guidance on the interpretation of the waste classification. Commission Notice 2010/C 252/03.
18. ¶18 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, section 5.11 (Crosscutting Classification Systems), Table 29; trade and waste code sets also at Tables 1 and 2. The observation that legally mandated systems are the most consistently populated is the Handbook’s.
19. ¶19 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, section 5.5.1. Codes for the same polymers appear in the resin identification systems used in collection and sorting.

0. ¶20 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, sections 5.7.1 and 5.8.1. Uncollected waste is defined as all solid plastic waste escaping waste management systems, formal and informal.
1. ¶21 SPREP (2018). Cleaner Pacific 2025: Pacific Regional Waste and Pollution Management Strategy 2016–2025.
2. ¶22 Lebreton, L.C.M. et al. (2017). River plastic emissions to the world's oceans. *Nature Communications*, 8: 15611.
3. ¶23 International Maritime Organization. London Convention (1972) and London Protocol (1996) on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter.
4. ¶24 SEEA CF, paragraphs 3.78–3.79.
5. ¶25 Jambeck, J.R. et al. (2015). Plastic waste inputs from land into the ocean. *Science*, 347(6223): 768–771. Inadequately managed waste leakage range 15–40%, central estimate 15%.
6. ¶26 Lau, W.W.Y. et al. (2020). Evaluating scenarios toward zero plastic pollution. *Science*, 369(6510): 1455–1461.
7. ¶27 Borrelle, S.B. et al. (2020). Predicted growth in plastic waste exceeds efforts to mitigate plastic pollution. *Science*, 369(6510): 1515–1518.
8. ¶28 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, section 5.10.6. Waste composition data compiled for National Atmospheric Emissions Inventory reporting, used to calculate landfill emissions, feeds the submissions countries make to the UNFCCC and is often the only nationally specific composition data available.
9. ¶29 IPCC (2019). 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5, Chapter 2: Waste Generation, Composition and Management Data. Regional default shares as tabulated in GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, Table 28.
0. ¶30 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, section 5.10.5. Composition studies are point-in-time measurements; the Handbook notes that resource intensity typically limits them to quarterly or annual intervals rather than continuous monitoring, and that sample selection is the principal threat to representativeness.
1. ¶31 IPCC (2006). Guidelines for National Greenhouse Gas Inventories, Volume 5, Chapter 5: Incineration and Open Burning of Waste. Adaptation of the equation to yield plastic mass rather than emissions follows GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, section 5.10.6.
2. ¶32 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, section 5.5.1.
3. ¶33 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, section 5.9.1, citing Medina (2008) and related literature on informal waste collection in developing economies.
4. ¶34 SEEA CF, Table 3.18 and paragraphs 3.268–3.278.
5. ¶35 Richardson, K. et al. (2019). Estimates of fishing gear loss rates at a global scale. *Fish and Fisheries*, 20(6): 1218–1231.
6. ¶36 Richardson et al. (2019) remains the primary source for global ALDFG loss-rate estimates. No comprehensive post-2019 update providing regional or gear-specific rates is yet available in the peer-reviewed literature. Compilers requiring country- or fishery-specific rates should consult national and regional fisheries management organisation (RFMO) data and outputs from the FAO/IMO GloLitter Partnerships programme (<https://gloilitter.imo.org/> (<https://gloilitter.imo.org/>)), which is developing improved gear-loss datasets by gear type and region. Hodgson (2022) is a legal analysis and does not contain gear-specific loss-rate data; Macfadyen et al. (2009) is a precursor study that informed Richardson et al. (2019) and should not be cited as an independent source of loss-rate values.
7. ¶37 International Maritime Organization. MARPOL Annex V: Regulations for the Prevention of Pollution by Garbage from Ships.
8. ¶38 Schmidt, C., Krauth, T., and Wagner, S. (2017). Export of plastic debris by rivers into the sea. *Environmental Science and Technology*, 51(21): 12246–12253.
9. ¶39 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, Annex 5, Table 60, which organises sampling and monitoring methods by realm and biome following the IUCN Global Ecosystem Typology (<https://global-ecosystems.org/> (<https://global-ecosystems.org/>)) in order to remain consistent with accounting frameworks. The recommendation to sample pelagic waters opportunistically, and the observation that no protocol specific to artificial marine structures existed as of 2025, are both the Handbook's.
0. ¶40 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, section 5.10.4. Platforms named for analysis include Google Earth Engine, ArcGIS and QGIS; ground-truthing at selected locations is specified as a validation step, not an optional extra.
1. ¶41 OSPAR Commission (2010). Guideline for Monitoring Marine Litter on the Beaches in the OSPAR Maritime Area.
2. ¶42 Classification of Environmental Protection Activities and Expenditure (CEPA), Class 3.2: Collection and transport.
3. ¶43 UN Statistics Division. SDG Indicator 14.1.1 Metadata.
4. ¶44 SEEA Ecosystem Accounting (2021), Chapter 5 on ecosystem condition; see Table 5.1 on condition variable classification and paragraphs 5.15–5.30 on ecosystem condition characteristics, including physical and chemical state (abiotic characteristics).
5. ¶45 SEEA CF, paragraphs 3.268–3.277 and Chapter VI on combined presentations.

6. ¶46 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, Step 4, Table 11, which records the engagement challenges for informal collectors as trust-building, irregular operations and safety concerns.
7. ¶47 SEEA Ecosystem Accounting (2021), Chapter 3 on spatial units, particularly paragraphs 3.38–3.45 on marine areas.
8. ¶48 SPREP (2018). Pacific Regional Action Plan: Marine Litter 2018–2025. Secretariat of the Pacific Regional Environment Programme. <https://pacific-data.sprep.org/system/files/Pacific%20Regional%20Action%20Plan%20-%20Marine%20Litter.pdf> (<https://pacific-data.sprep.org/system/files/Pacific%20Regional%20Action%20Plan%20-%20Marine%20Litter.pdf>). UNEP (2021), From Pollution to Solution: A global assessment of marine litter and plastic pollution, Nairobi.
9. ¶49 SEEA CF, paragraphs 2.121–2.123 on geographical boundaries; see also paragraph 5.493 on spatial and temporal detail for water resources.
10. ¶50 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, section 5.10.3.
1. ¶51 National and sectoral material flow analyses compiled in GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, Table 15: Ministry of Environment, Sri Lanka (2024), National Plastic Waste Inventory for Sri Lanka; Statistics Norway (2023), Plastic Account for Norway; Lobelle et al. (2023) for the Netherlands; Ivanovic et al. (2022) for the German healthcare sector; Kawecki et al. (2018) for Europe; the ERIA Regional Knowledge Centre for Marine Plastic Debris for Thailand, the Philippines, Malaysia and Viet Nam; the Australian Department of Climate Change, Energy, the Environment and Water (Australian Plastics Flows and Fates national report); and Deshpande et al. (2020) for Norway. Compilers should verify the current status and methodology of each before relying on it.
2. ¶52 United Nations (2015). Transforming our world: the 2030 Agenda for Sustainable Development. A/RES/70/1.
3. ¶53 UN Environment Programme (2021). SDG 14.1.1 Indicator Methodology: Index of Coastal Eutrophication and Floating Plastic Debris Density.
4. ¶54 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, section 5.9.2, Table 27.
5. ¶55 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, Step 2, Tables 3 and 4.
6. ¶56 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, Step 3, Tables 6 and 7, and Key Action 3 (Gap Analysis Validation).
7. ¶57 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, Step 2, Key Action 4 and Table 5.
8. ¶58 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, Annex 4 (Strategies for handling inconsistent reporting), and section 5 (“Dealing with Inconsistent Data”).
9. ¶59 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, Step 1, Key Action 3, and section 5 (“Minimum Data Requirements”).
10. ¶60 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, Step 4, Key Actions 1 and 2.
1. ¶61 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, Step 4, Key Actions 3 and 4, Tables 10 to 12 and the summary of engagement challenges.
2. ¶62 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, section 6.2.1. The legislative instruments cited are the EU Packaging and Packaging Waste Directive 94/62/EC as amended and Directive (EU) 2019/904 on single-use plastics; the Republic of Korea’s Act on the Promotion of Saving and Recycling of Resources (2003); and the 2022 amendments to the Canadian Environmental Protection Act establishing the federal plastics registry.
3. ¶63 GOAP / UNSW Centre for Sustainable Development Reform and GRID-Arendal (forthcoming). Plastics Data Collection and Reporting Handbook, sections 6.2.2 to 6.2.4.
4. ¶64 United Nations et al. (2014). System of Environmental-Economic Accounting 2012 – Central Framework. New York: United Nations, paragraphs 3.268–3.278.
5. ¶65 TNFD (2023). Recommendations of the Taskforce on Nature-related Financial Disclosures, Metrics for nature-related risks and opportunities.