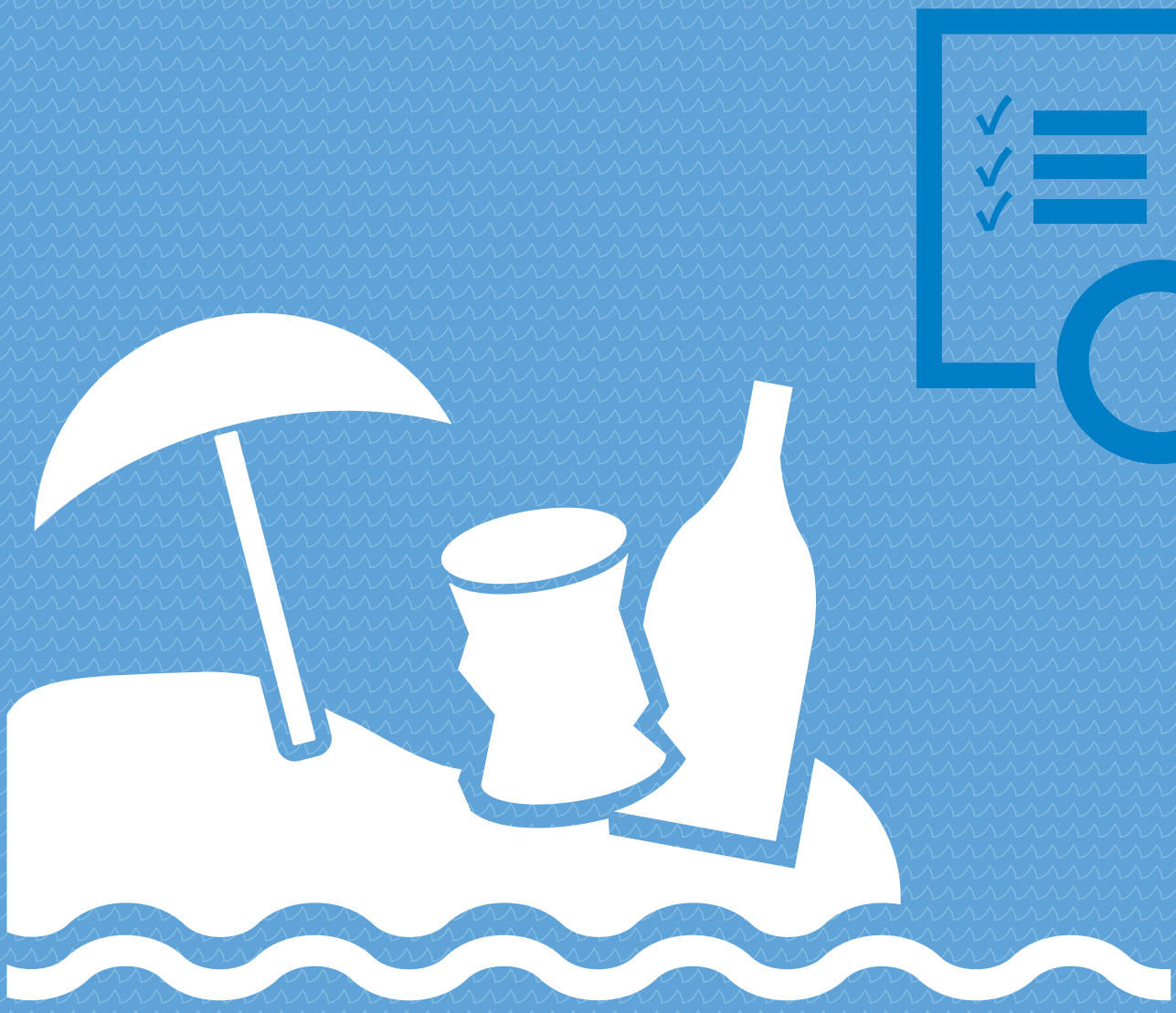
Updated HELCOM Guidelines for monitoring of beach litter

Baltic Marine Environment Protection Commission

Marine litter

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1. Background

1.1 Introduction

Litter on the coastline is one of the most obvious signs of marine litter. Surveys of litter on the beach allow for a detailed evaluation of litter in terms of amounts and composition. Its strength lies in the provision of information on sources of litter and the potential effectiveness of management and measures applied, and to some extent, potential harm to marine biota and ecosystems as well as social harm (aesthetic value, economic costs, hazard to human health).

1.2 Purpose and aims

Monitoring the number of litter items per 100 m beach segment provides information on both the status of spatial and temporal distribution of marine beach litter along the coast of the Baltic Sea area.

The aim is to provide spatiotemporal information for detection of short-term status and long-term trends and to ensure that the data is compatible for the HELCOM core indicator 'Beach litter'.

2. Monitoring methods

2.1 Monitoring features

Surveys of litter at selected beaches are conducted to allow for a detailed evaluation of litter in terms of amounts and composition.

2.2 Time and area

Three sampling campaigns must be organised during the year, that is during spring, summer and autumn with the preferred months, April, July and October, respectively. If it is possible, according to national climatological conditions, a fourth campaign can be conducted during wintertime (January). While using harmonised monitoring periods among countries is highly recommended, it is ultimately the responsibility of national coordinators of beach litter surveys to select the survey periods most appropriate for their regions.

Beach litter is to be monitored by all HELCOM Contracting Parties, covering all coastal areas of the Baltic Sea. Detailed information related to national monitoring is contained in the 'Monitoring concepts table' of the sub-programme 'Macrolitter characteristics and abundance/volume' of the HELCOM Monitoring Manual.

2.3 Survey site selection

Survey sites should, whenever possible, have the following characteristics:

- a minimum length of 100 m along the water edge;
- composed of sand or gravel, secondarily of pebbles or cobbles;
- low to moderate slope;
- clear access to the sea (not blocked by breakwaters or jetties);

accessible to survey teams year-round.

2.4 Monitoring procedure

2.4.1 Monitoring strategy

Surveys of litter stranded on the coastline or deliberately left by people on beaches and shores are a primary tool for detection of litter in the marine environment and have been used world-wide to

quantify and describe the composition of marine litter pollution. These surveys allow for a detailed evaluation of litter in terms of amounts and composition. Their strength lies in the provision of information on sources of litter and the potential effectiveness of management and measures applied, and to some extent, potential harm to marine biota and ecosystems as well as social harm (aesthetic value, economic costs, hazard to human health).

2.4.2 Sampling method(s) and equipment

Beaches to be sampled

Beaches are to be identified following the definitions contained in Table 1 with the understanding that not all four criteria (environment, accessibility, habitation, accommodation, services and facilities) are to be fulfilled when a beach is to be assigned to one of the beach types, e.g. urban, semi- urban or remote/natural. Choosing a mix of beach types will provide knowledge on different kinds of sources of litter. Litter on rural beaches is more likely to indicate sea-based sources and the litter situation at sea (background values for litter pollution level) - since very little littering is expected from visitors. Urban and semi-urban beaches reflect, to a higher degree, the contribution of land-based activities on and nearby the beach.

It is recommended that all HELCOM Contracting Parties include at least one remote or natural beach in their monitoring program. This beach should meet the criteria outlined in Table 1, have minimal visitors traffic and not be subject to regular cleaning by external parties. For beaches that undergo routine cleaning, litter monitoring should be conducted as close as possible to the scheduled cleaning time, but before the cleaning occurs.

Table 1. Main characteristics of different beach types. Source: MSFD Technical Group on Marine Litter *et al*. (2023).

	ENVIRONMENT	**ACCESSIBILITY**	**HABITATION, ACCOMMODATION**	**SERVICES AND FACILITIES**
URBAN	Located in front of urban areas, with a wide range of well-established public services (shopping areas, business districts, etc.).	Accessible by both public and private transport.	Large population and large-scale residential and tourist accommodation.	Extensively developed range of services and facilities provided to beach users.
SEMI-URBAN	Located in the surroundings of the urban areas, adjacent to or within a small coastal town with small scale community services.	Accessible by both public and private transport.	Small residential populations and/or many beach users during the bathing season; presence of accommodation facilities (hotels, B&B, campsites).	A reduced range of services and facilities provided to beach users.

REMOTE/NATURAL	Remote and natural environment; preferably located away from small towns or villages; predominance of natural elements and absence of community services.	Accessible via private transport, boat or by walking; including those which are close to the general public.	Absence of residential population, housing or tourist accommodations.	Absence of services and facilities provided to beach users.

When expanding the monitoring program, avoid adding new beaches that are cleaned frequently between surveys, as this may skew the data. This approach ensures a more accurate representation of litter accumulation and helps maintaining consistency in the monitoring process. Coordinators should rely on their expertise and knowledge of the coastal area, as well as their understanding of the marine litter situation in their country. This experience will help them make informed decisions during the final selection process.

A description of the beaches to be sampled is to be provided, including information on distance from harbours and cities, usage intensity/number of visitors, date of the last cleaning and frequency of the cleaning process. It is advocated to use a survey site identity form to register such metadata, and good examples can be found in the MSFD Technical Group on Marine Litter *et al*. (2023), Annex I on survey site (beach) identity form (A1) and Annex II on sampling unit identity form (A2). This guidance further contains an example of information that can be useful to register prior each monitoring occasion in its Annex III on marine litter monitoring survey form (A3).

Sampling segment and area

The length of the segment of the coastline to be sampled should be 100m.

The width of the beach (from the waterline to the back of the beach, e.g. the foot of dunes or high vegetation behind) is also to be reported. The area should preferably also include the highest waterline with litter deposited also under more extreme high water conditions.

2.4.3 Sample handling and analysis

Litter items, with a lower size limit of about 2.5cm, are to be counted and recorded within the type of materials detailed in Table 2. The amount of litter per type of material in number of items is to be determined. Some litter items of smaller than 2.5 cm, listed in Table 3, should also be counted.

Table 2. Material types into which the litter is to be classified.

Type of material	**Code**
Artificial polymer materials	Plastic
Rubber	Rubber
Clothes/textile	Textile
Paper/cardboard	Paper
Processed/worked wood	Wood
Metal	Metal
Glass/ceramics	Glass
Chemicals	Chemicals
Food waste	Organic

Table 3. Items that should be recorded during the macro litter surveys even if smaller than 2.5 cm in the longest dimension. Source: MSFD Technical Group on Marine Litter *et al*., 2023.

Litter items
Metal fisheries-related weights/sinkers, and lures
Metal bottle caps, lids and pull tabs from cans
Metal household batteries
Plastic caps/lids drinks
Plastic medical/pharmaceuticals containers/tubes/packaging
Plastic caps/lids chemicals, detergents (non-food)
Plastic caps/lids unidentified
Plastic rings from bottle caps/lids
Plastic biomass holder from sewage treatment plants and aquaculture
Plastic toys and party poppers
Plastic fishing light sticks / fishing glow sticks including packaging
Foamed plastic packaging
Tobacco products with filters (cigarette butts with filters)
Rubber band (small, for kitchen/household/post use)
Rubber balloons

Cigarette butts and portion snus are to be recorded as artificial polymer materials. Portion snus is not yet an item on the Joint List of Litter Categories for Marine Macrolitter Monitoring (MSFD Technical Group on Marine Litter *et al*., 2023) and it is recommended to enter these items as "cigarette butts" until further notice.

Litter items are identified using different coding lists and the Joint List of Litter Categories for Marine Macrolitter Monitoring is recommended for harmonization purposes (MSFD Technical Group on Marine Litter *et al*., 2023). However, other litter lists are also available, e.g. UNEP/IOC, 2009, OSPAR, 2020.

Two or more fragments recognizable as pieces from the same broken item are counted as one item.

All litter items should be removed from the beach during the survey. The litter collected should be disposed of properly. Larger items that cannot be removed safely should be marked (with for example paint spray) so that they are not counted again during the next survey.

2.5 Data analysis

Beach litter monitoring is occasionally conducted on beach stretches that deviate from the normal 100m length. If so, all data must be standardized to a 100m beach segment before analysis. For example, if items are recorded along a 300m stretch, the count should be divided by 3 to calculate the average number of items per 100m.

It is recommended to perform beach litter analyses similar to those conducted for the third HELCOM holistic assessment of the state of the Baltic Sea (HOLAS 3), although national-level assessments may focus on different aspects of interest. These analyses typically include:

- Median counts of Total count of litter, Plastic litter, Single-use plastics and Fishing-related items,
- Time trends for the above litter groups,
- Top-ten litter item lists,
- Median counts for non-plastic materials.

For more detailed information on these analyses, please refer to HELCOM BLUES A3.1 (2023).

3. Data reporting and storage

Data should be stored by the Contracting Parties. Countries are to provide their national data to the European Marine Observation and Data Network, EMODnet database (https://emodnet.ec.europa.eu/en/marine-litter).

4. Quality control

4.1 Quality control of methods

Contracting parties should follow the HELCOM monitoring guidelines but minor deviations from them are acceptable if the method achieves comparable results. Validation of the adopted method needs to be performed nationally e.g. by taking part regularly in inter-comparison studies or proficiency testing schemes.

Quality assurance and quality control should be primarily targeted at the education of the field teams to ensure that litter collection and characterization is consistent across surveys.

4.2 Quality control of data and reporting

As part of the quality control, the following actions are recommended:

- using data duly verified by experts for database import;
- (transnational) joint beach litter collections in terrain;
- (transnational) joint training sessions/workshops with practical, comparative work on specific beach litter items/samples;
- "calibration" based on defined test samples;
- comparative control collections directly after routine surveys; and
- cooperation with experts outside the HELCOM area.

5. Contacts and references

5.1 Contact persons

HELCOM Expert Group on Marine Litter (EG-Marine Litter).

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