Monitoring Marine Litter on Beaches

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MIO-ECSDE MAIN LINES OF ACTION TO COMBAT MARINE LITTER

MARINE LITTER | DEFINITION

Marine litter is any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment

Photo: Thomais Vlachogianni

ML MONITORING | THE EU FRAMEWORK

MSFD Descriptor 10 on Marine Litter:

“Properties and quantities of marine litter do not cause harm to the coastal and marine environment”

Criteria 10.1 Characteristics of litter in the marine and coastal environment

- ✓ trends in the amount of litter washed ashore and/or deposited on coastlines, including analysis of its composition, spatial distribution and, where possible, source (10.1.1)
- ✓ trends in the amount of litter in the water column (including floating at the surface) and deposited on the sea-floor, including analysis of its composition, spatial distribution and, where possible, source (10.1.2)
- ✓ trends in the amount, distribution and, where possible, composition of microparticles (in particular microplastics) (10.1.3)

Criteria 10.2 Impacts of litter on marine life

- ✓ trends in the amount and composition of litter ingested by marine animals (e.g. stomach analysis) (10.2.1)

ML MONITORING | THE HELCOM FRAMEWORK

The Regional Action Plan for Marine Litter in the Baltic Sea was adopted in 2015

It recommends to identify by 2016 the way forward to establish coordinated monitoring programmes for the common marine litter indicators including data collection for the regular assessment of the state of ML in the Baltic Sea

WHAT IS MONITORING

Monitoring is a long term, standardized measurement, observation, evaluation and reporting of the environment in order to define status and trends.

For any monitoring program, the objectives must be clearly stated, the methodology clearly defined and quality control implemented to ensure quality data.

ML monitoring and the MSFD

ML monitoring is undertaken to assess whether a desired state of the marine environment, in terms of objectives or targets is being met.

Within the MSFD marine litter monitoring aims to assess:

- ✓ whether Good Environmental Status (GES) has been achieved or maintained, and if environmental status is improving, stable or deteriorating;
- ✓ the progress towards achieving the environmental targets set .

More specifically, ML monitoring aims to provide information on the types, quantities, distribution and impacts of marine debris; to identify the sources of marine debris; and to assess the effectiveness of management measures to address the issue.

THE MARINE LITTER WATCH MONTH

The MARINE LITTER WATCH MONTH
Citizens in action to track marine litter
17 September to 16 October 2016

Aims to fill the 'data gaps' that hamper an effective implementation of essential measures to address the growing threat of marine litter

Photos: Thomais Vlachogianni

MARINE LITTER MONITORING

✓Coordinated
✓Harmonized
✓Comparable
✓Reliable

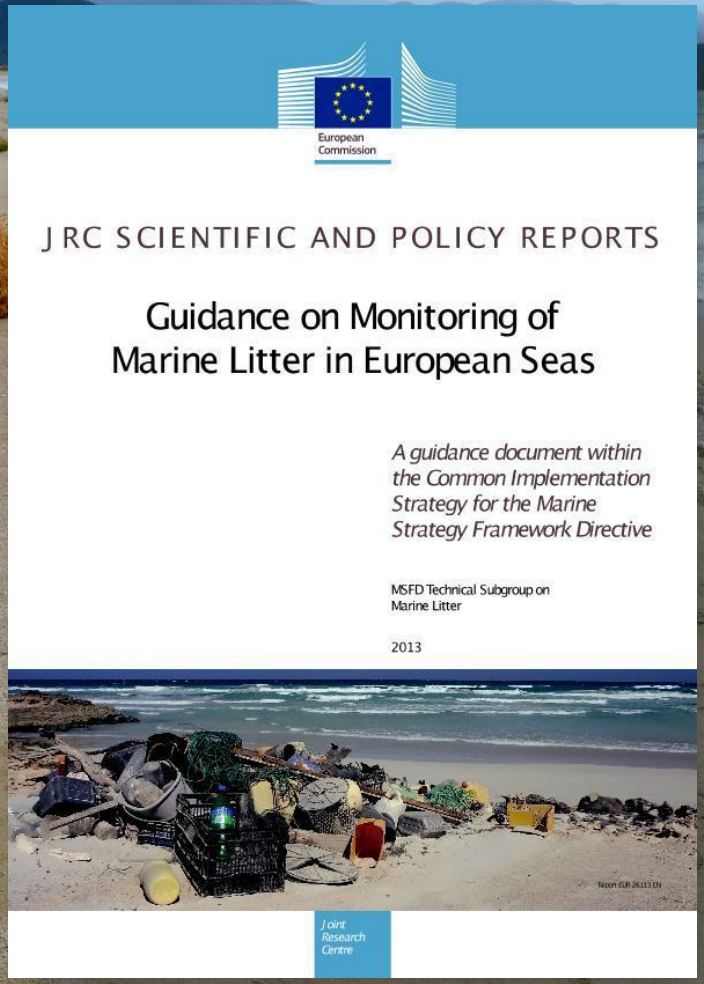
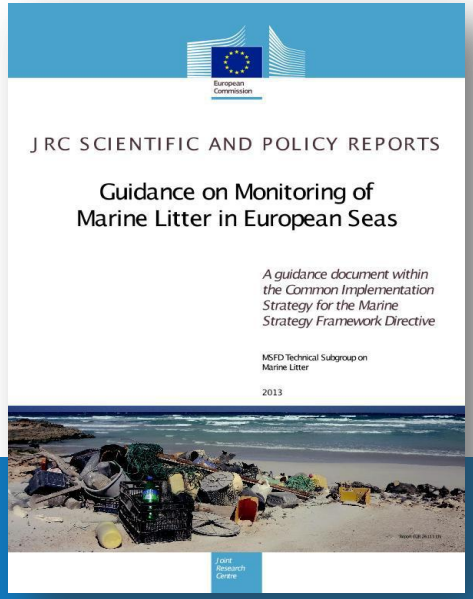
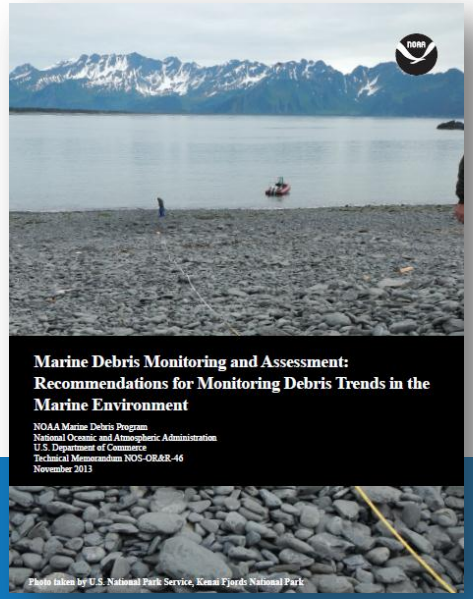
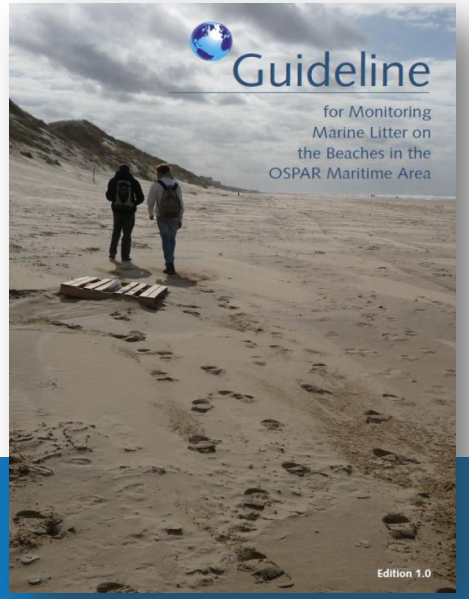


Photo: Thomais Vlachogianni

STANDARDIZED ML MONITORING | NOT YET THERE!



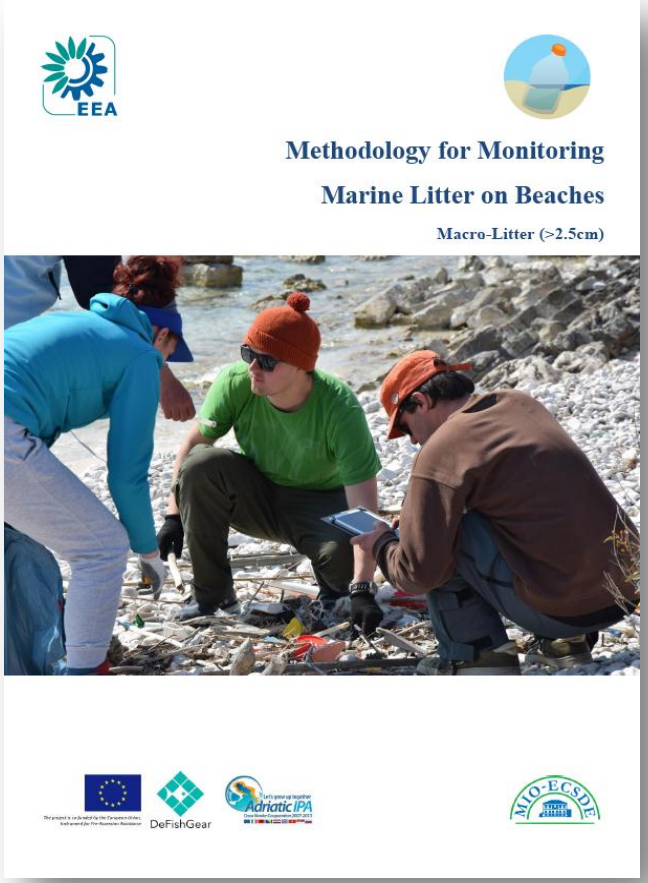




In recent years, research efforts have significantly increased the knowledge on the issue of marine litter however the field as a whole **has not adopted standardized monitoring procedures**.

Within the frameworks of the MSFD and the Regional Seas Conventions considerable work is being carried out towards defining and/or establishing monitoring programmes which are coordinated, compatible, coherent, consistent and comparable.

THE METHODOLOGY ON MONITORING ML ON BEACHES



MIO-ECSDE

KEY STEPS & ELEMENTS OF ML MONITORING ON BEACHES

- Site selection
- Sampling units
- Frequency and timing of surveys
- Pre-survey characterization of sites
- Size limits and classes to be surveyed
- Collection and identification of litter
- Quantification of litter
- Equipment/Consumables
- Safety

Photo: Thomais Vlachogianni

SITE SELECTION

Site location	Site features
✓ In the vicinity of ports or harbors; ✓ In the vicinity of river mouths; ✓ In the vicinity of coastal urban areas; ✓ In the vicinity of tourists destinations; ✓ In relatively remote areas.	✓ Having a minimum length of 100 m; ✓ Low to moderate slope; ✓ Clear access to sea; ✓ Accessible to survey teams throughout the year; ✓ Ideally the site should not be subject to cleaning activities; ✓ Survey activities posing no threat to endangered or protected species.

Photo: Thomais Vlachogianni


Sampling
locations

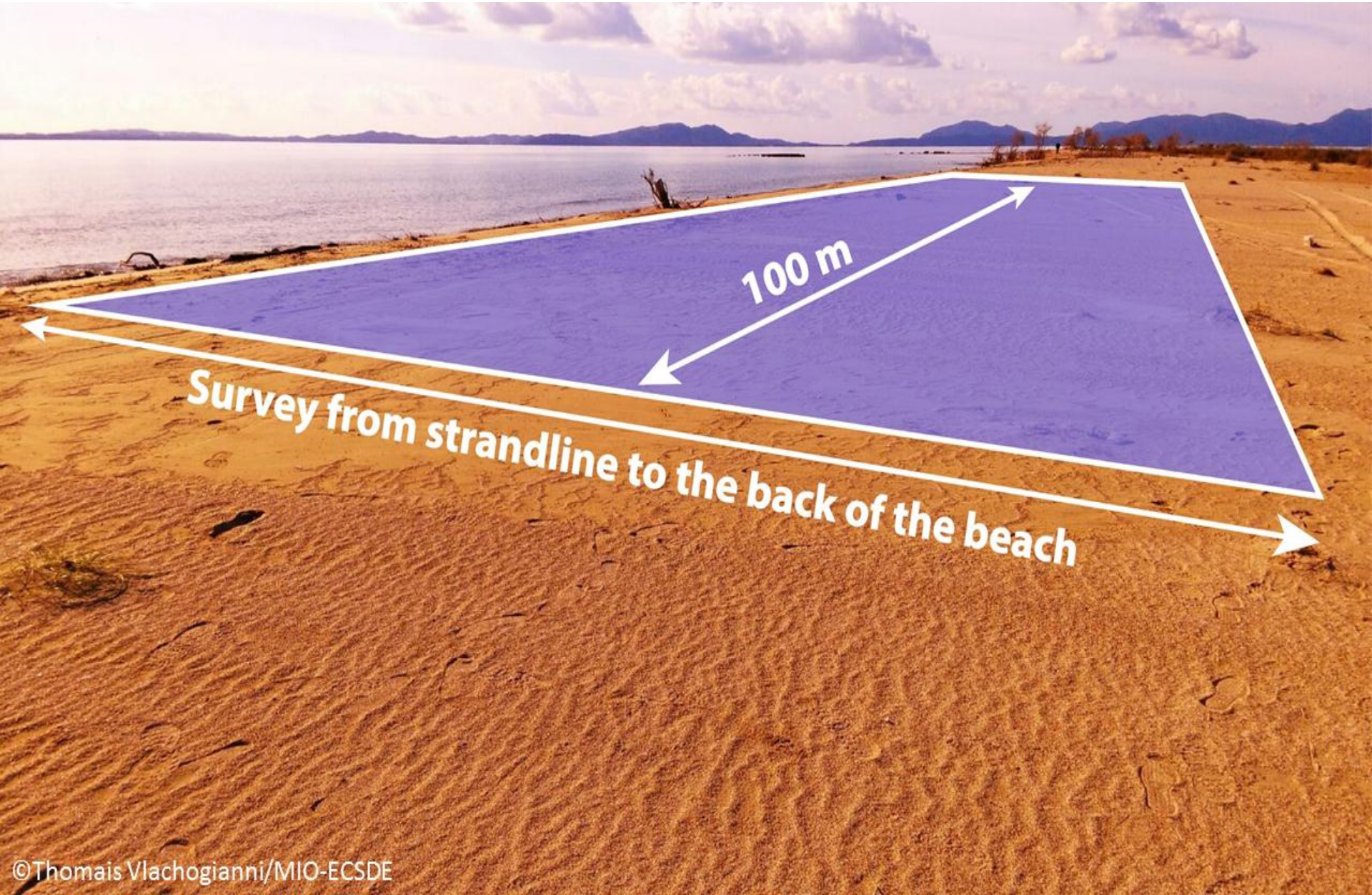
Sampling locations

SAMPLING UNITS

A **sampling unit** is defined as a fixed section of a beach covering the whole area from the strandline to the back of the beach. Within this methodology one sampling unit is used: **100-metres stretch from the strandline to the back of the beach**.

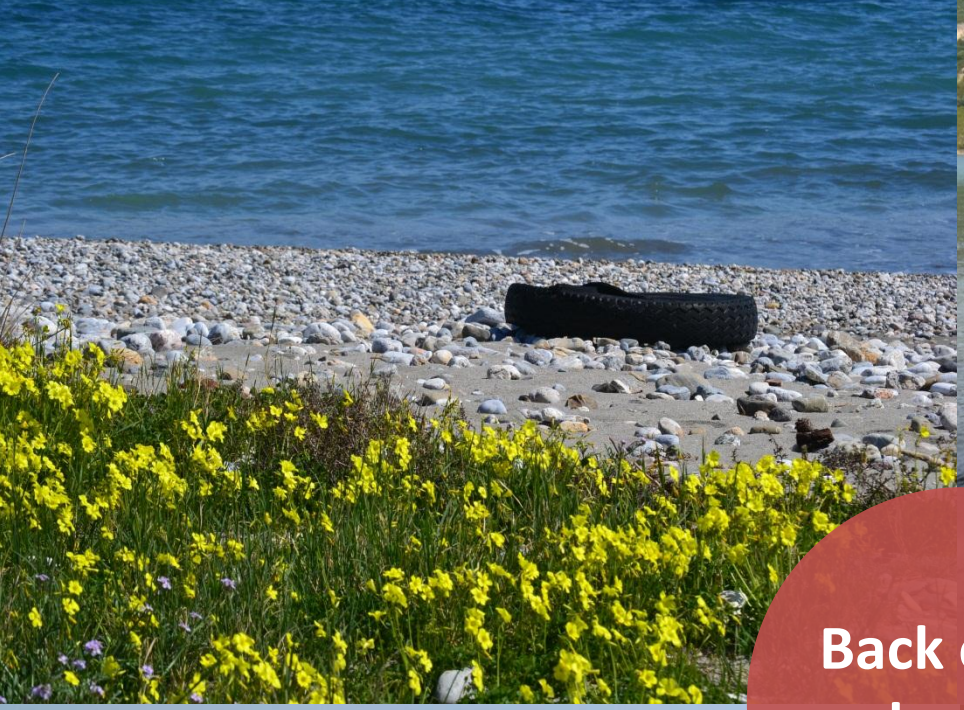
- ✓ The back of the beach needs to be explicitly identified using coastal features such as the presence of vegetation, dunes, cliff base, road, fence or other anthropogenic structures such as seawalls
- ✓ Two (2) sections of a 100-metre stretch on the same beach should be monitored, separated at least by a distance of 50m.

SAMPLING UNITS

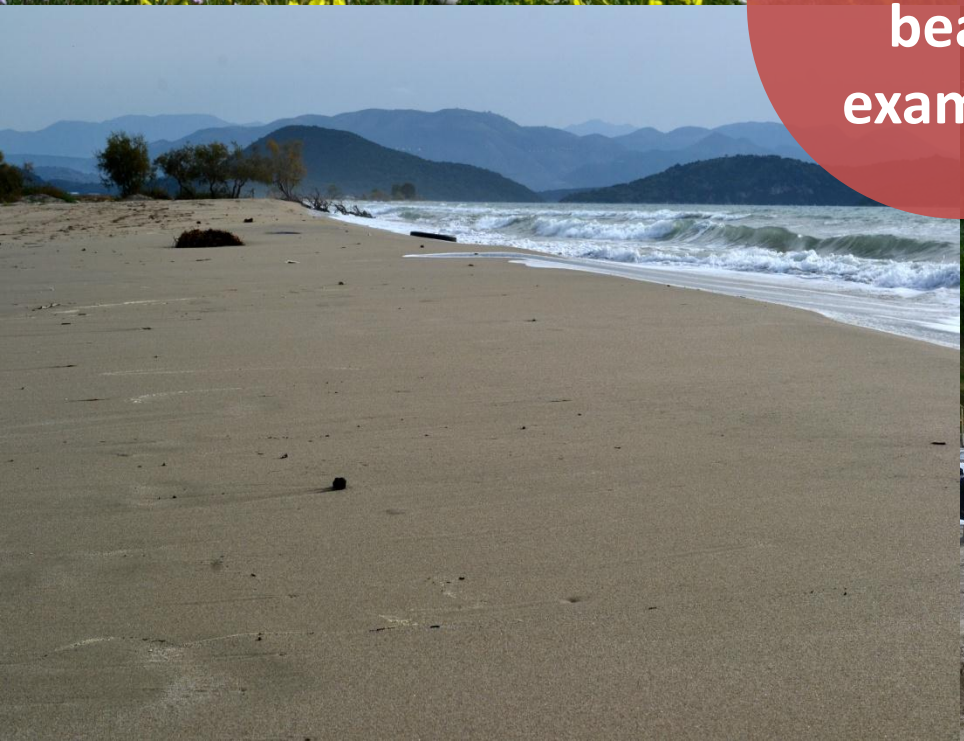


SAMPLING UNIT

Photo: Thomais Vlachogianni



Back of the beach examples



REPRESENTATIVE SAMPLE | REPLICATES

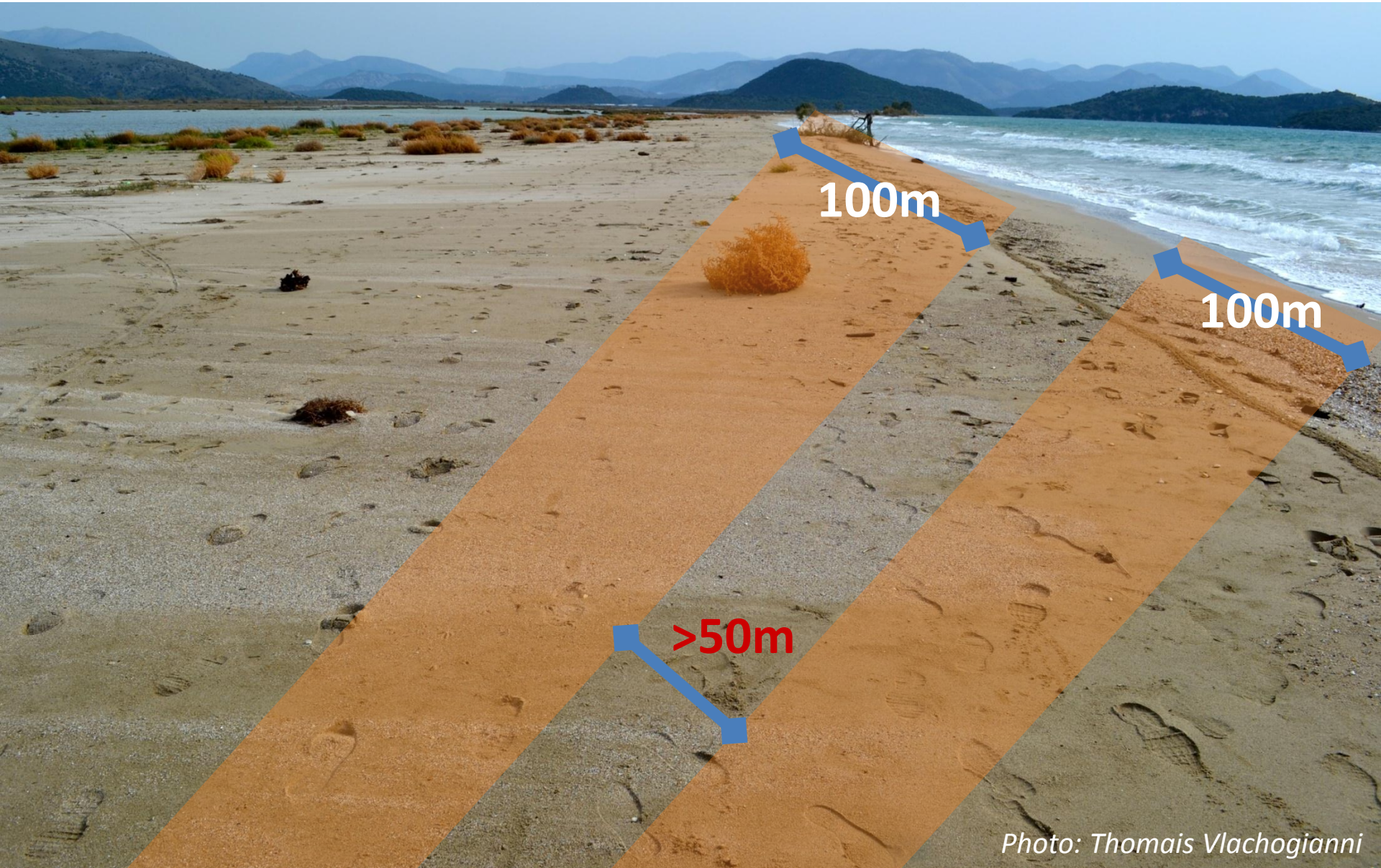


Photo: Thomais Vlachogianni

FREQUENCY AND TIMING OF SURVEYS

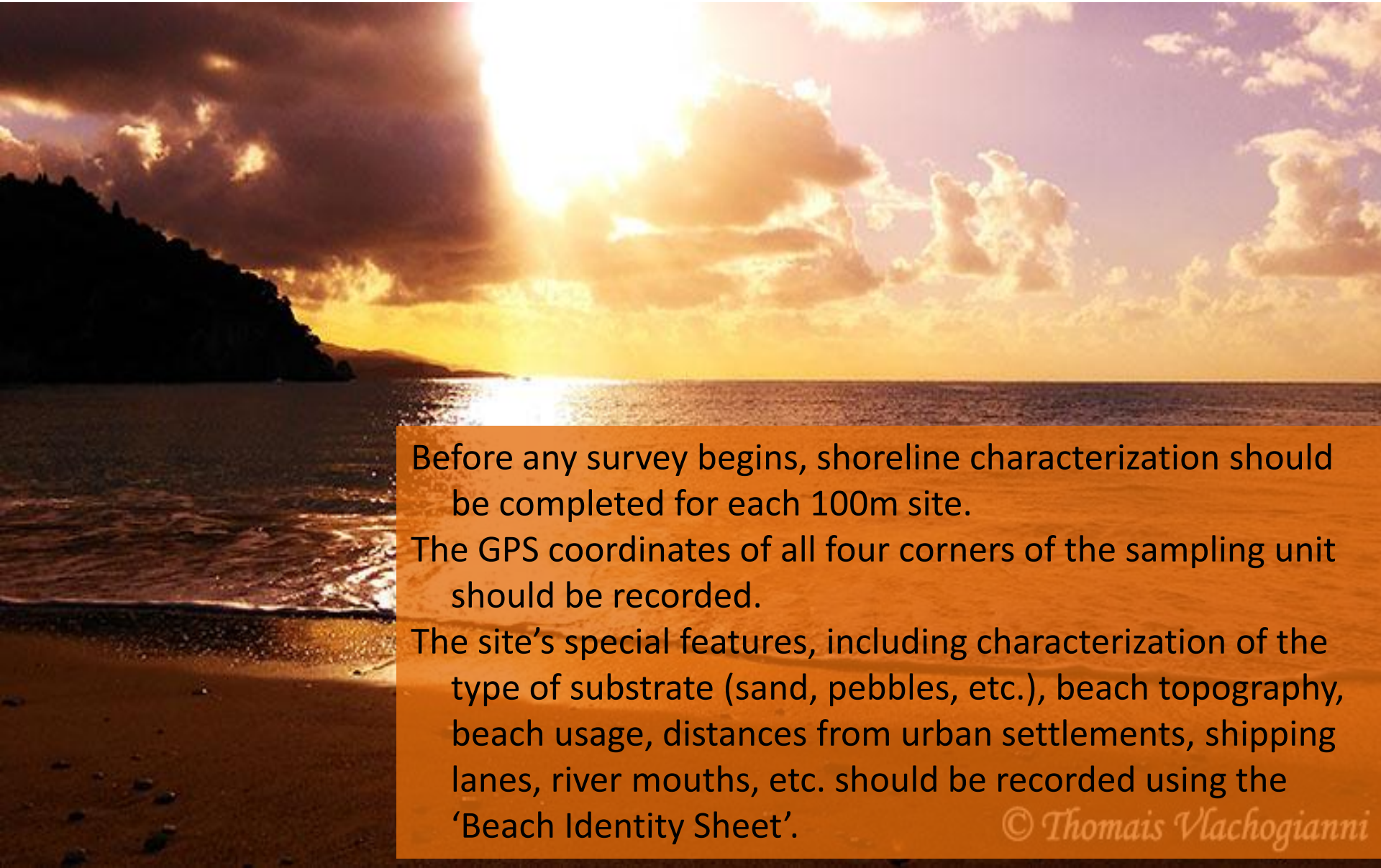
Frequency: 4 surveys/year (minimum)

Surveys timing:

- ✓ Autumn: mid Sep-mid Oct
- ✓ Winter: mid Dec-mid Jan
- ✓ Spring: Apr
- ✓ Summer: mid Jun-mid Jul

It should be kept in mind that any circumstances that may lead to unsafe situations for the surveyors such as heavy winds, etc. should be avoided. The safety of the surveyors must always come first!

PRE-SURVEY CHARACTERIZATION OF SITES

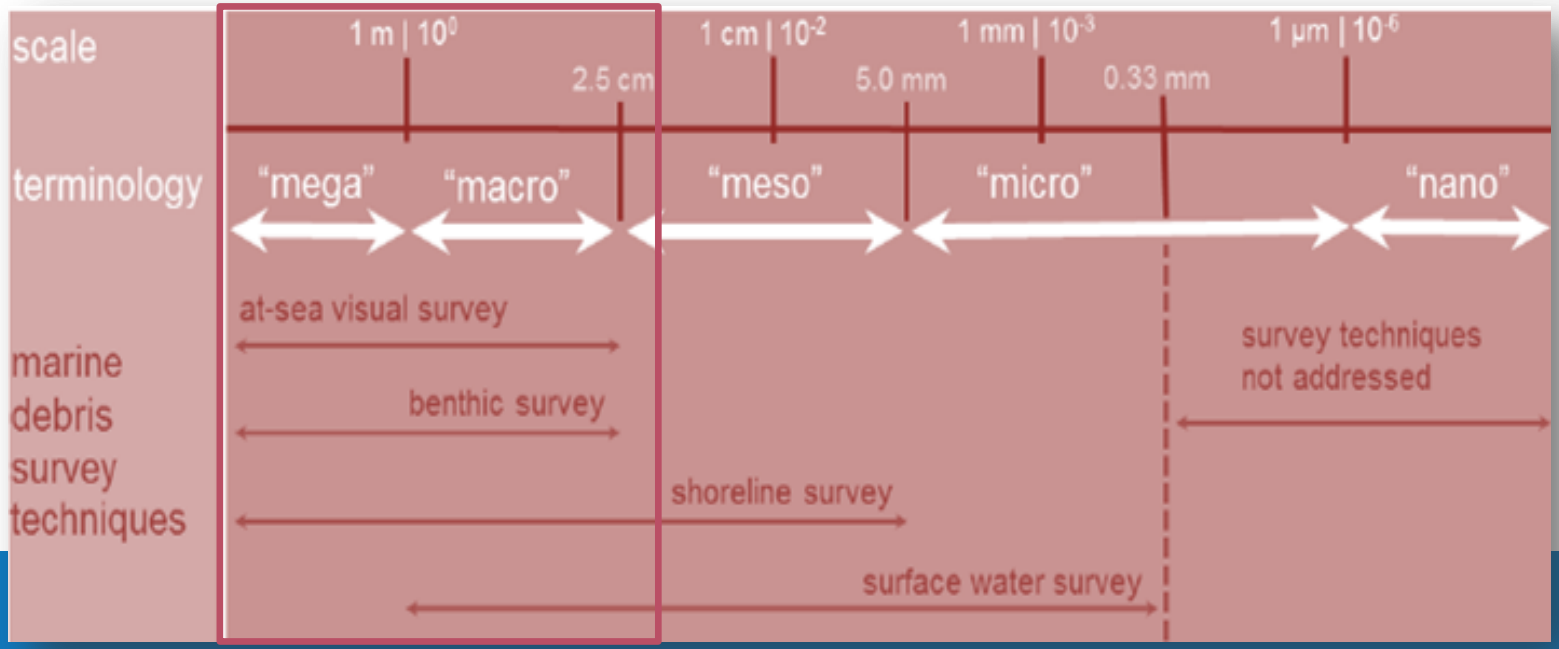


Before any survey begins, shoreline characterization should be completed for each 100m site.

The GPS coordinates of all four corners of the sampling unit should be recorded.

The site's special features, including characterization of the type of substrate (sand, pebbles, etc.), beach topography, beach usage, distances from urban settlements, shipping lanes, river mouths, etc. should be recorded using the 'Beach Identity Sheet'.

SIZE LIMITS AND CLASSES TO BE SURVEYED



Source: S. Lippiatt, S. Opfer, C Arthur. Marine Debris Monitoring and Assessment. NOAA Technical Memorandum NOS-OR&R-46, (2013).

- ✓ **There are no upper size limits** to litter recorded on beaches.
- ✓ Litter items with **a lower limit of 2.5cm** in the longest dimension will be monitored, ensuring the inclusion of caps & lids and cigarette butts.
- ✓ In case, the latter classes are found in extremely high numbers, a 1-meter transect will be used instead, to monitor these items, thus saving energy and time.

COLLECTION & IDENTIFICATION OF LITTER ITEMS

According to the ‘Master List’, which consists of a set of 159 beach litter items

MLW Code	PLASTIC
G1	4/6-pack yokes, six-pack rings
G3	Shopping Bags incl. pieces
G4	Small plastic bags, e.g. freezer bags incl. Pieces
G5	Plastic bags collective role; what remains from rip-off plastic bags
G7	Drink bottles <=0.5l
G8	Drink bottles >0.5l
G9	Cleaner bottles & containers
G10	Food containers incl. fast food containers
G11	Beach use related cosmetic bottles and containers, eg. Sunblocks
G12	Other cosmetics bottles & containers
G13	Other bottles & containers (drums)
G14	Engine oil bottles & containers <50 cm
G15	Engine oil bottles & containers > 50 cm
G16	Jerry cans (square plastic containers with handle)
G17	Injection gun containers
G18	Crates and containers / baskets
G19	Car parts
G21	Plastic caps/lids drinks
G22	Plastic caps/lids chemicals, detergents (non-food)
G23	Plastic caps/lids unidentified
G24	Plastic rings from bottle caps/lids
G25	Tobacco pouches / plastic cigarette box packaging
G26	Cigarette lighters
G27	Cigarette butts and filters
G28	Pens and pen lids
G29	Combs/hair brushes/sunglasses
G30	Crisps packets/sweets wrappers
G31	Lolly sticks
G32	Toys and party poppers
G33	Cups and cup lids
G34	Cutlery and trays
G35	Straws and stirrers
G36	Fertiliser/animal feed bags
G37	Mesh vegetable bags
G40	Gloves (washing up)

LITTER ITEMS

Interpreting small pieces of litter in a harmonized way

- ✓ Pieces of litter that are recognizable e.g. as a shopping bag (G3) should be registered as such.
- ✓ Pieces of materials that are not recognizable as an item e.g. plastic and/or polystyrene pieces should be counted according to their size (G75-G83).

- ✓ All litter items should be removed from the beach during the survey.
- ✓ Larger items that cannot be removed (safely) by the surveyors should be marked, with for example paint spray (which meets environmental friendly standards) so that they will not be counted again at the next survey.
- ✓ The litter collected should be disposed of properly.
- ✓ Regional or national regulations and arrangements should be followed. If these do not exist local municipalities should be informed.

QUANTIFICATION OF LITTER ITEMS

The unit in which litter will be assessed on the coastline will be number of items and it will be expressed **as counts of litter items per square meter** (m^2). In addition, the main category types of litter items should be weighed.

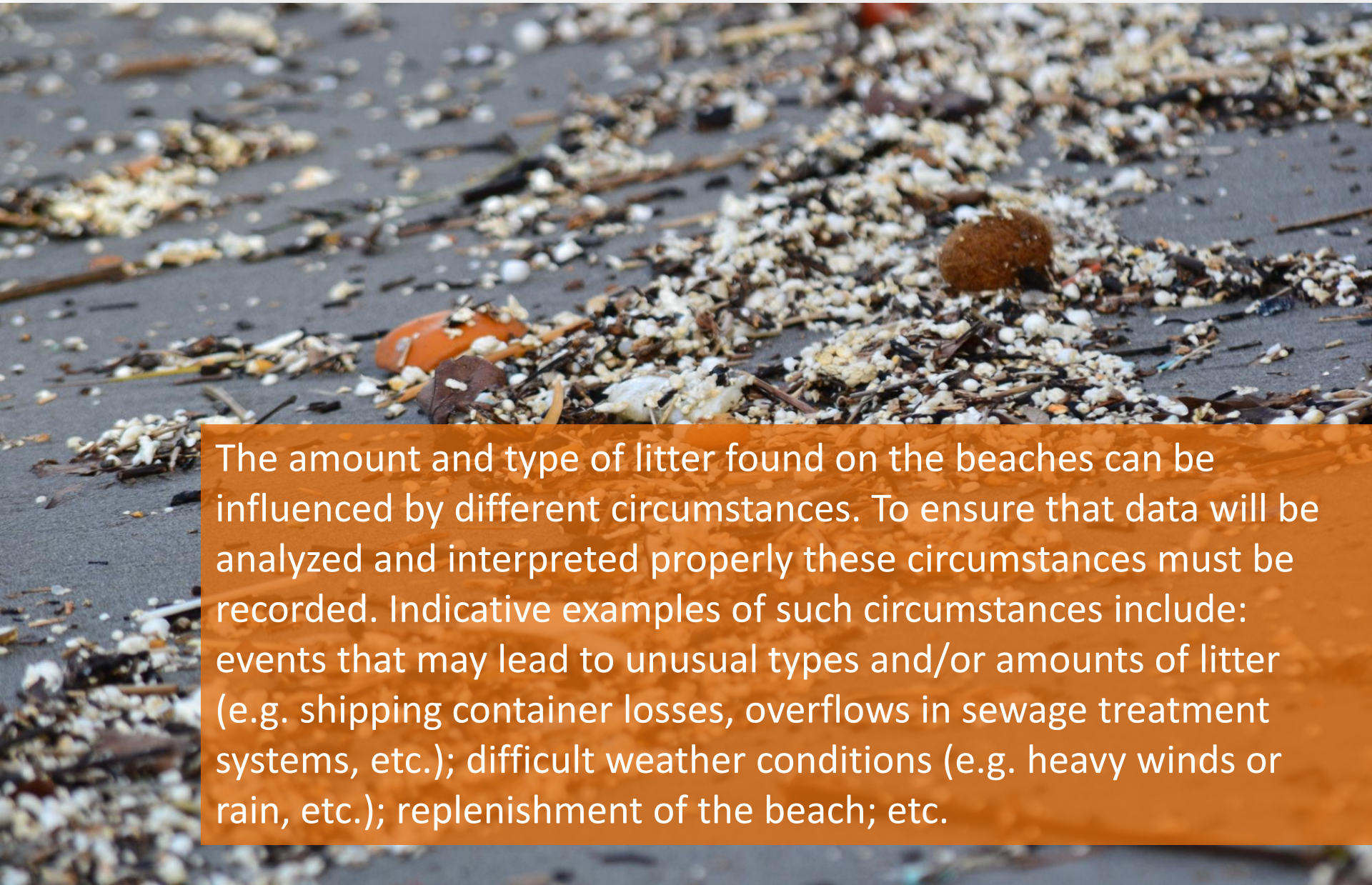
EQUIPMENT/CONSUMABLES

- ✓ Digital camera;
- ✓ Hand-held GPS unit;
- ✓ Extra batteries (ideally rechargeable batteries);
- ✓ Tape measure/pedometer;
- ✓ Flag markers/stakes;
- ✓ 100-foot measuring tape (fiberglass preferred);
- ✓ First aid kit (to include sunscreen, bug spray, drinking water);
- ✓ Protective gloves;
- ✓ Clipboard for each surveyor;
- ✓ Recording sheets (printed on waterproof paper) and pencils;
- ✓ Rubbish bags;
- ✓ Rigid container and sealable lid to collect sharp items such as needles, etc.;
- ✓ Appropriate clothing;
- ✓ Scales (if possible to weight your bags of collected debris);

SAFETY

- ✓ Wear appropriate clothing.
- ✓ If you come across a potentially hazardous material , contact competent authorities to report the item with as much information as possible. Do not touch the material or attempt to move it.
- ✓ Large, heavy objects should be left in place.
- ✓ When in doubt, don't pick it up! If unsure of an item, do not touch it. If the item is potentially hazardous, report it to the appropriate authorities.
- ✓ Do not conduct field operations in severe weather conditions.
- ✓ Be aware of your surroundings and be mindful of trip and fall hazards.
- ✓ Carry a means of communication for emergencies, for example a cell phone or radio.
- ✓ Always carry a first aid kit. The kit should include an emergency water supply and sunscreen, as well as bug spray.
- ✓ Understand the symptoms of heat stress and actions to treat it.
- ✓ Make sure to carry enough water.
- ✓ The surveyor team should be composed of at least two people.

ADITIONAL CONSIDERATIONS



The amount and type of litter found on the beaches can be influenced by different circumstances. To ensure that data will be analyzed and interpreted properly these circumstances must be recorded. Indicative examples of such circumstances include: events that may lead to unusual types and/or amounts of litter (e.g. shipping container losses, overflows in sewage treatment systems, etc.); difficult weather conditions (e.g. heavy winds or rain, etc.); replenishment of the beach; etc.

STOPPING
MARINE LITTER TOGETHER

For more than twenty years
joining forces & building bridges
in the Euro-Mediterranean area

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