SWIM and Horizon 2020 Support Mechanism

Working for a Sustainable Mediterranean, Caring for our Future

METHODOLOGIES FOR MONITORING MARINE LITTER IN THE COASTAL AND MARINE ENVIRONMENT

Presented by:

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ASSESSMENT OF MARINE LITTER IN THE EGYPTIAN MEDITERRANEAN COASTLINE

19/09/2017, Alexandria, Egypt

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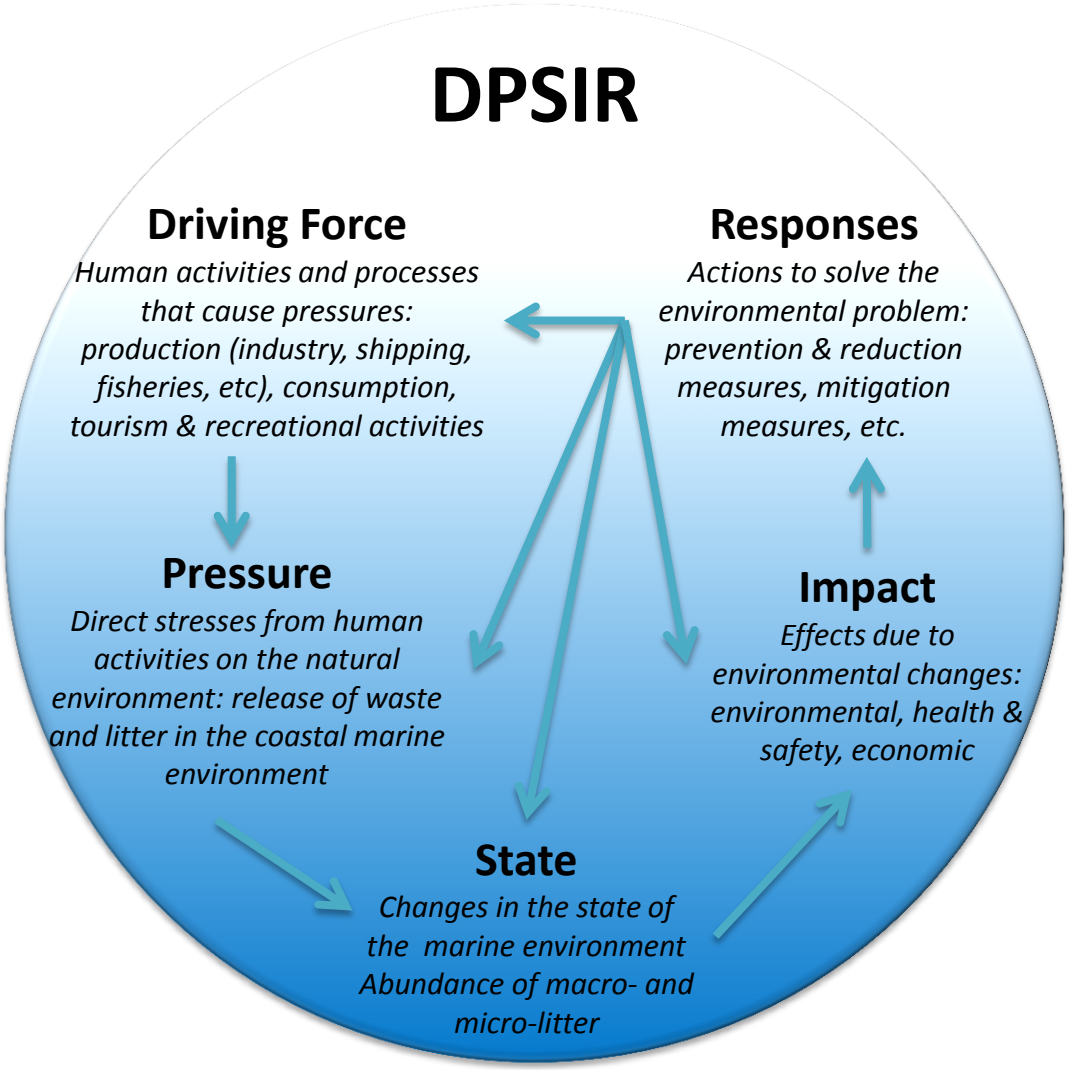
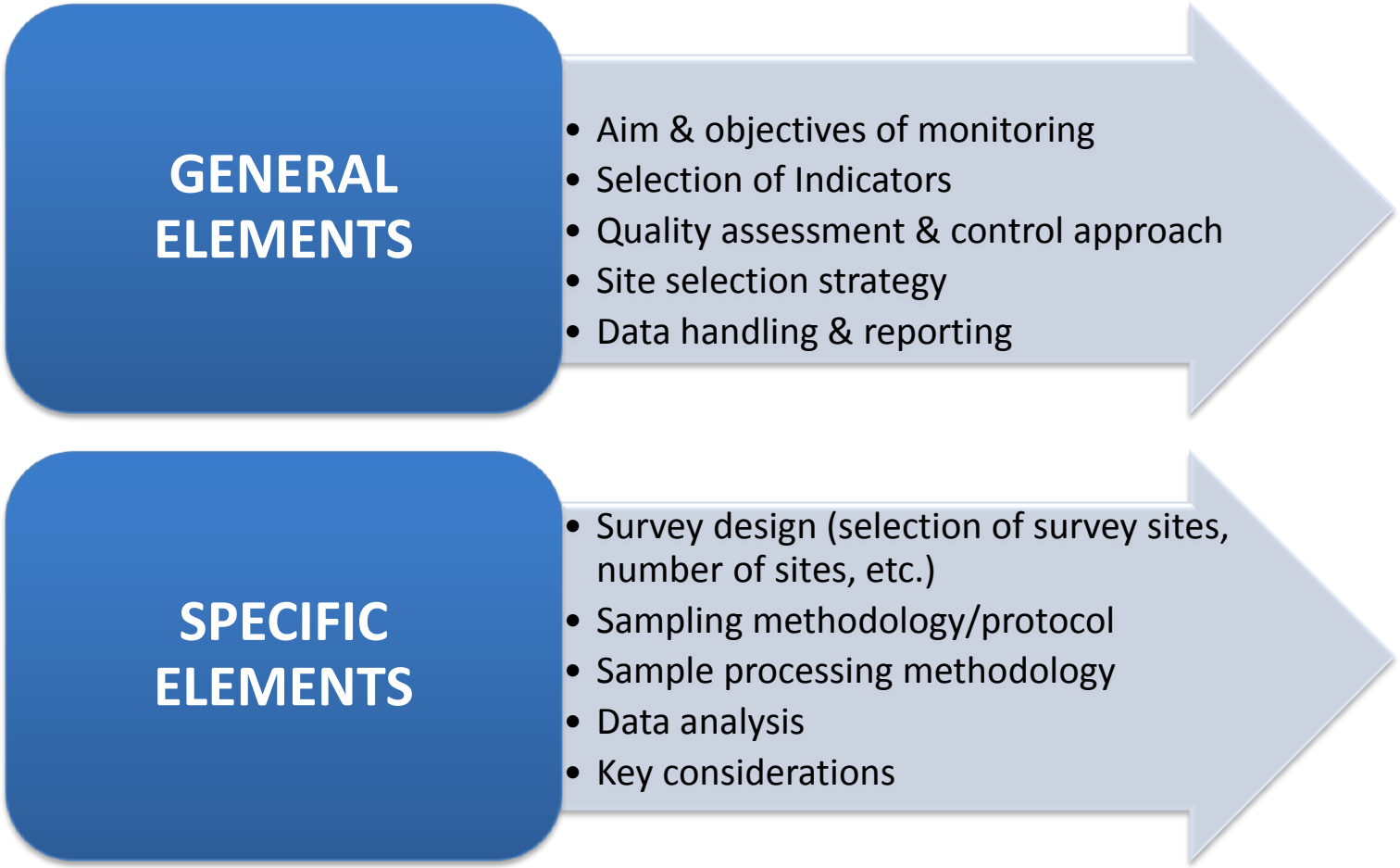
INTRO TO MONITORING | WHAT & WHY

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

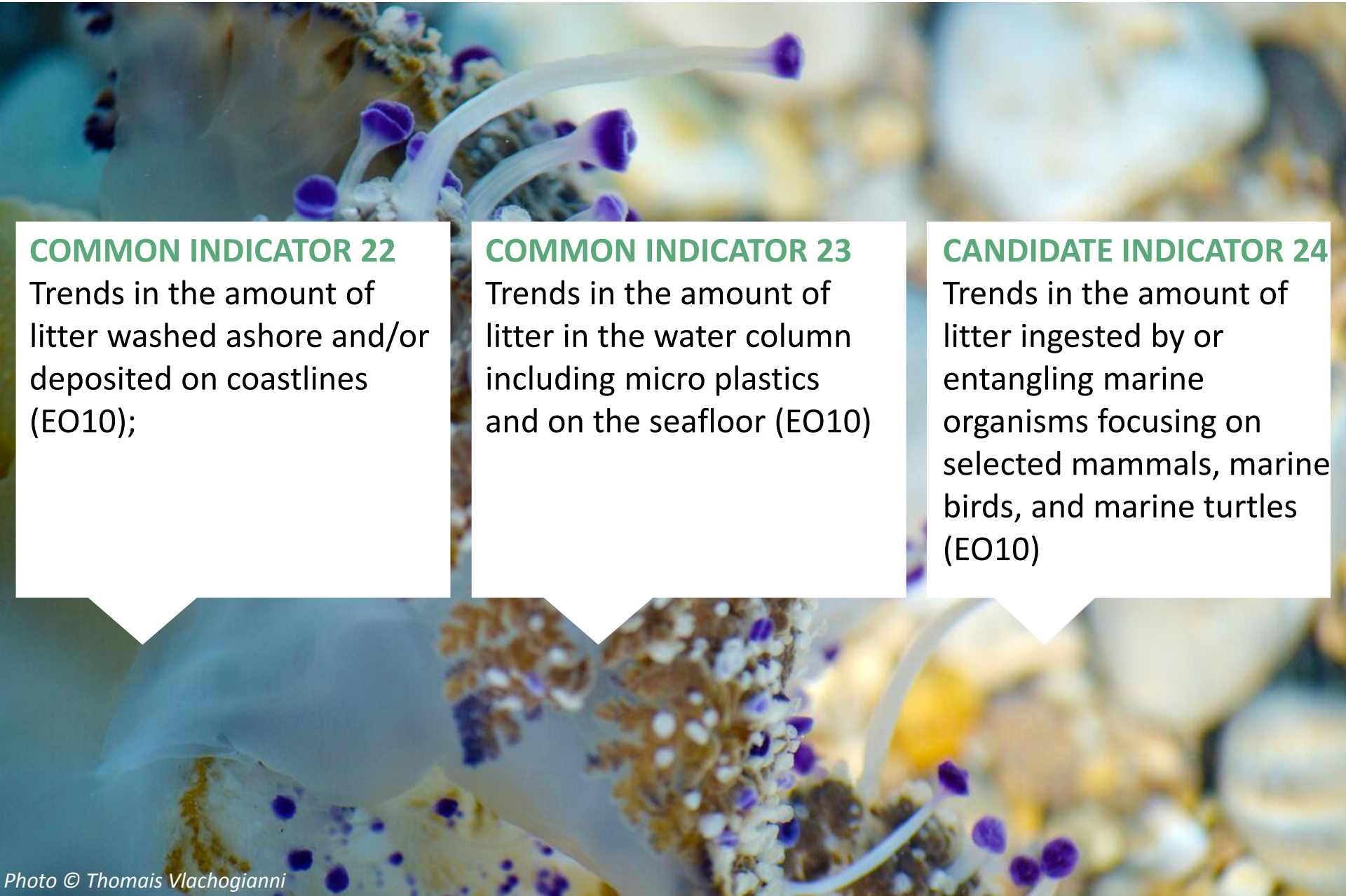
More specifically, ML monitoring aims to provide information on the **types, quantities, distribution** and **impacts** of marine debris; to **identify the sources** of marine debris; and to **assess the effectiveness of management measures** to address the issue.



HOW TO MONITOR |
KEY ELEMENTS OF A ML MONITORING STRATEGY



THE IMAP (BARCELONA CONVENTION) ML INDICATORS



COMMON INDICATOR 22
Trends in the amount of litter washed ashore and/or deposited on coastlines (EO10);

COMMON INDICATOR 23
Trends in the amount of litter in the water column including micro plastics and on the seafloor (EO10)

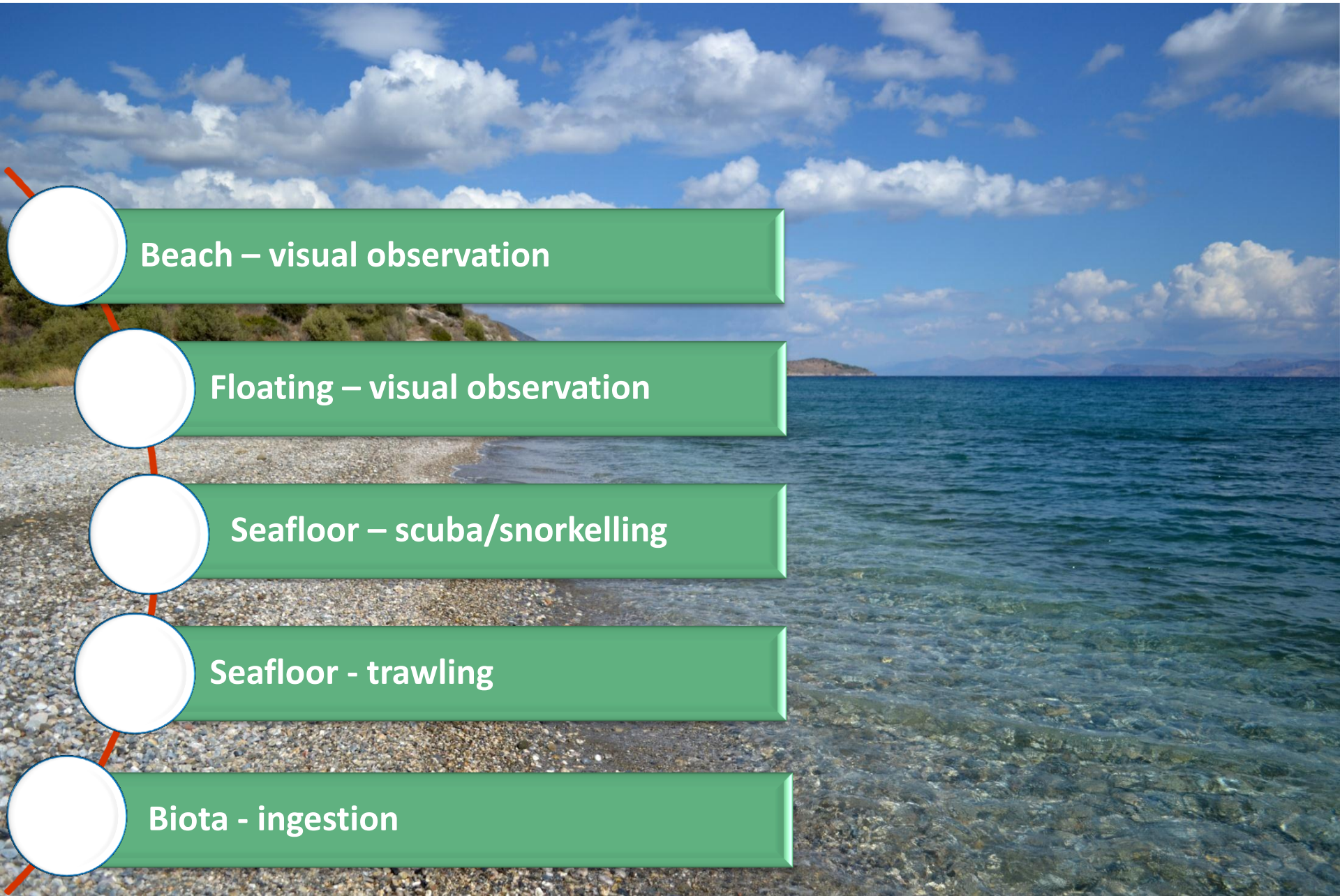
CANDIDATE INDICATOR 24
Trends in the amount of litter ingested by or entangling marine organisms focusing on selected mammals, marine birds, and marine turtles (EO10)

Photo © Thomais Vlachogianni

COMPREHENSIVE OVERVIEWS FOR ML MONITORING

- the EU MSFD TG10 "**Guidance on Monitoring of Marine Litter in European Seas**"
- the OSPAR "**Guideline for Monitoring Marine Litter on the Beaches in the OSPAR Maritime Area**"
- the NOOA "**Marine Debris Monitoring and Assessment: Recommendations for Monitoring Debris Trends in the Marine Environment**"
- The UNEP/MAP MEDPOL "**Monitoring Guidance Document on Ecological Objective 10: Marine Litter**"
- The EU IPA-Adriatic DeFishGear project related "Monitoring Methodologies for Marine Litter"

SELECTED METHODS MACRO ML MONITORING



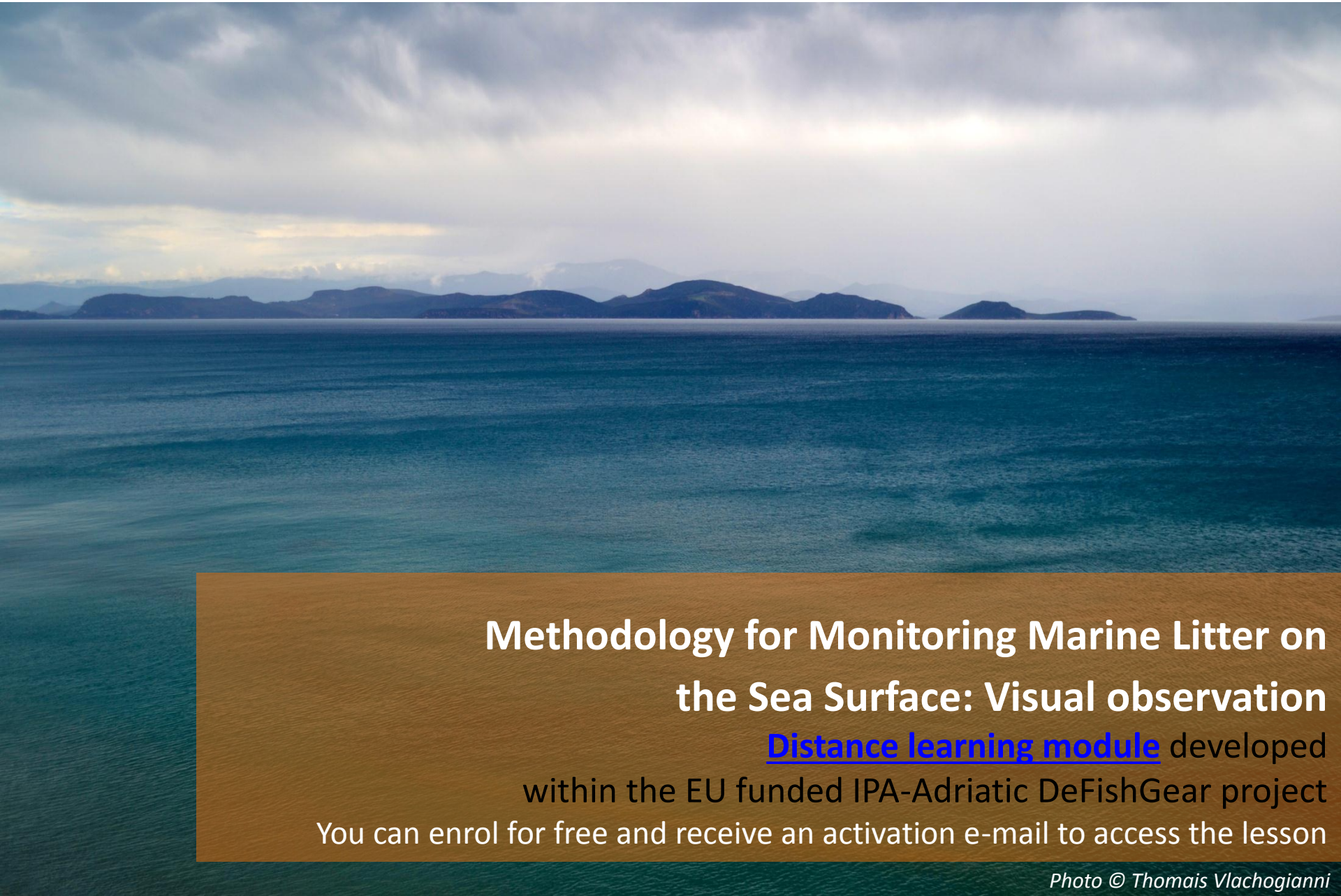
SELECTED METHODS FOR MICRO ML MONITORING

- Sea surface – manta trawl
- Fish - ingestion

Photo © Thomais Vlachogianni

Methodology for Monitoring Marine Litter on Beaches

Distance learning module developed
within the EU funded IPA-Adriatic DeFishGear project
You can enrol for free and receive an activation e-mail to access the lesson



Methodology for Monitoring Marine Litter on the Sea Surface: Visual observation

Distance learning module developed within the EU funded IPA-Adriatic DeFishGear project

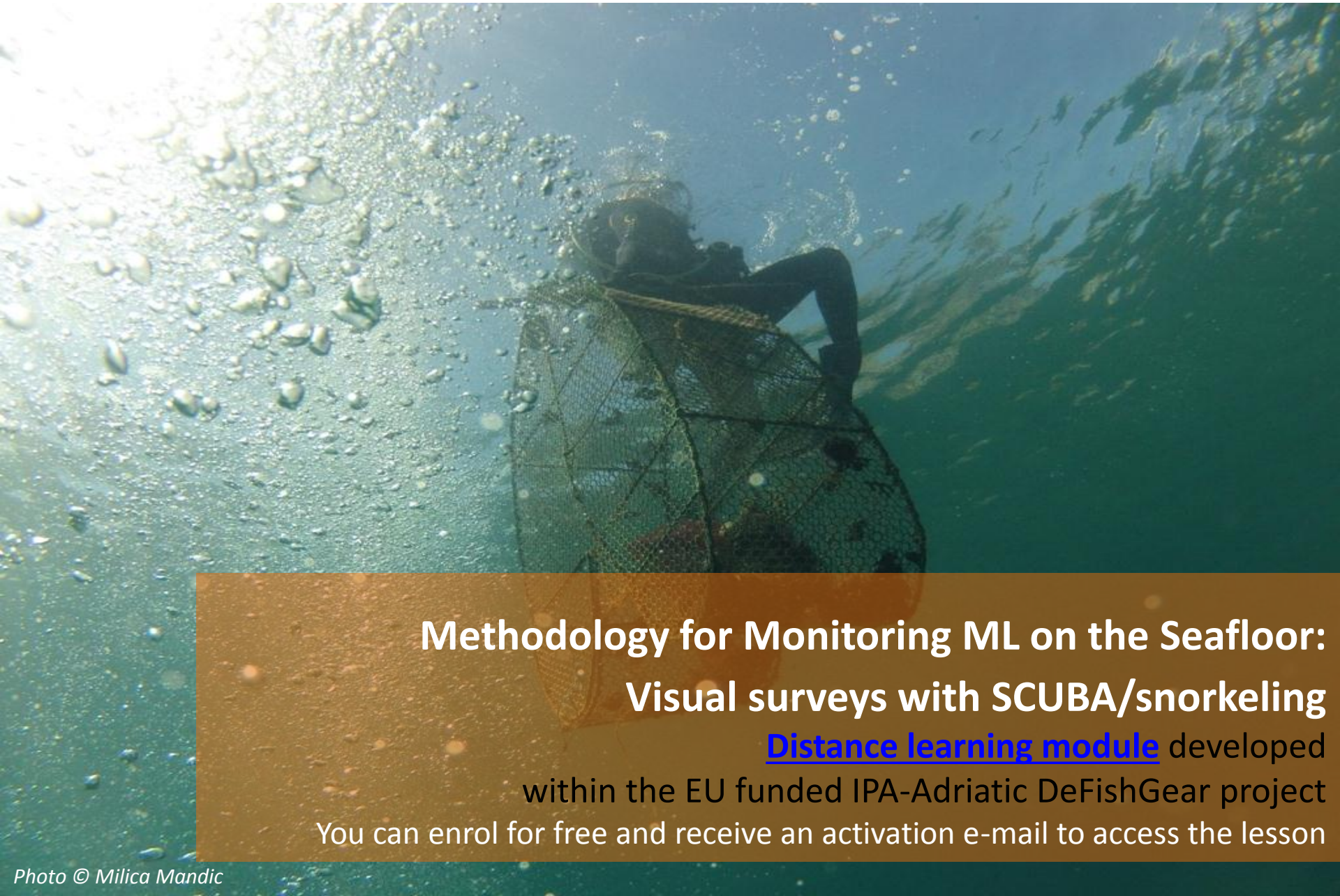
You can enrol for free and receive an activation e-mail to access the lesson

Photo © Thomais Vlachogianni

Methodology for Monitoring Marine Litter on the Seafloor (continental shelf): Bottom trawl surveys

Distance learning module developed within the EU funded IPA-Adriatic DeFishGear project

You can enrol for free and receive an activation e-mail to access the lesson



Methodology for Monitoring ML on the Seafloor: Visual surveys with SCUBA/snorkeling

Distance learning module developed within the EU funded IPA-Adriatic DeFishGear project

You can enrol for free and receive an activation e-mail to access the lesson

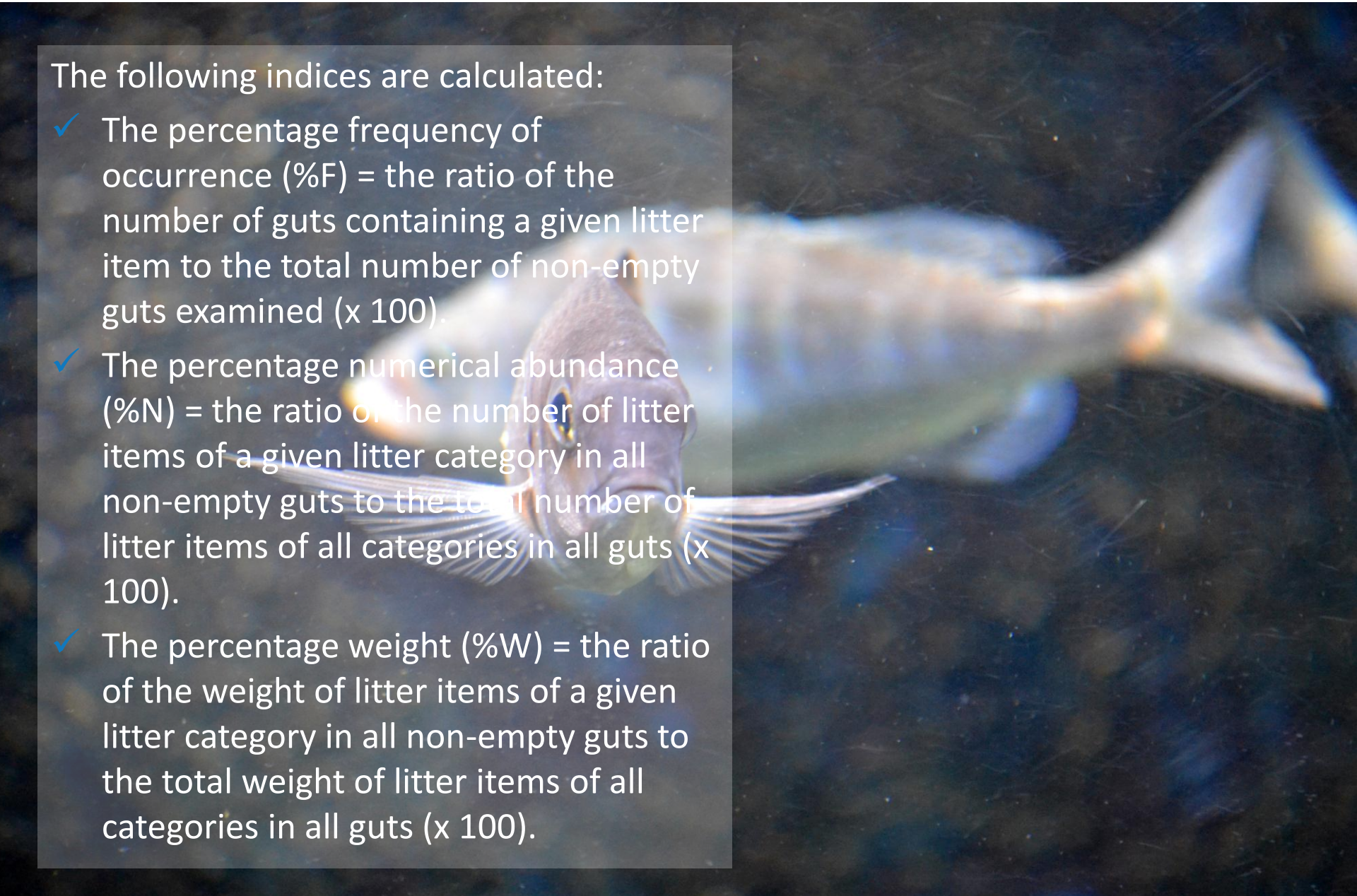
Photo © Milica Mandic

Methodology for Monitoring ML ingested by fish

OVERVIEW OF THE KEY STEPS FOR MONITORING MACRO ML IN FISH SPECIES

- ✓Collection of specimens
- ✓For each specimen, the main biological parameters (e.g. length, weight, sex) are recorded.
- ✓Then, fish are dissected and stomachs and intestines are removed and placed in sealed bags and frozen again or stomach and intestine contents are quickly removed and transferred to plastic vials until the next processing steps.
- ✓Stomach and intestine contents are weighed and then examined under a binocular stereomicroscope.
- ✓ML items are measured, weighed and classified by type.

OVERVIEW OF THE KEY STEPS FOR MONITORING MACRO ML IN FISH SPECIES



The following indices are calculated:

- ✓ The percentage frequency of occurrence (%F) = the ratio of the number of guts containing a given litter item to the total number of non-empty guts examined (x 100).
- ✓ The percentage numerical abundance (%N) = the ratio of the number of litter items of a given litter category in all non-empty guts to the total number of litter items of all categories in all guts (x 100).
- ✓ The percentage weight (%W) = the ratio of the weight of litter items of a given litter category in all non-empty guts to the total weight of litter items of all categories in all guts (x 100).

OTHER METHODOLOGIES FOR MACRO ML

ML ON THE SEA SURFACE

- ✓ Open sea surveys
- ✓ Aerial surveys
- ✓ Net tow surveys
- ✓ Riverine litter monitoring
- ✓ Monitoring through image acquisition

ML ON THE SEAFLOOR

- ✓ Shallow seafloor monitoring with towed video
- ✓ Deep seafloor monitoring using ROVs

ML IN BIOTA

- ✓ ML ingested by seabirds
- ✓ ML ingested by sea turtles
- ✓ ML ingestion by marine mammals
- ✓ Entanglement rates for beached animals

ASSESSING MICROLITTER IN THE SEA SURFACE

Sampling of microlitter on the sea surface with a manta net

Separation of microplastics from the sea surface samples

Chemical identification of microplastics with ATR-FTIR spectroscopy

USEFUL RESOURCES

- E-learning module on monitoring marine litter on beaches
- Video-guidelines on monitoring marine litter on beaches
- Methodology for monitoring marine litter on beaches (macro debris >2.5 cm)
- Methodology for monitoring marine litter on the sea surface
- Methodology for monitoring marine litter on the seafloor – bottom trawl surveys
- Methodology for monitoring marine litter on the seafloor – scuba/snorkelling
- Methodology for monitoring macro- and micro-litter in biota
- Methodology for sampling plastic pellets for POPs determination
- Protocol for Microplastics Sampling on the Sea Surface and Sample Analysis
- Methodology for monitoring microplastics on the sea surface and in beach sediments

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Thank you for your attention!

This Project is funded by the European Union