



Coastal Management and Monitoring Network

for tackling marine litter in Mediterranean sea



International Workshop:

"MONITORING MARINE LITTER IN ENVIRONMENT AND BIODIVERSITY"

Manfredonia (Italy), 12th - 14th July 2022

Regional Training on harmonized ML monitoring protocols

Presented by M. Cristina Fossi, University of Siena, Italy



"MONITORING MARINE LITTER IN ENVIRONMENT AND BIODIVERSITY"

We
are
all
Med

*The COMMON project **TRCs international workshop**, co-organized with Plastic Busters CAP project, aims to build the capacities of TRC managers and collaborators on how to design and conduct a fit-for-purpose marine litter monitoring program in coastal areas*

*save
the
date*

Date: July 12-14, 2022
Place: Manfredonia (Italy)

Click [here](#)
to register



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COastal Management and MOnitoring Network
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Plastic Busters initiative



Plastic Busters on basin scale

A crucial aspect of the marine litter issue, underlined by the **Barcelona Convention within the Regional Plan for Marine Litter** (Istanbul 2013) is that: "Marine pollution knows no border, pollution in one country affects all other 23 countries, hence there is a need for a regional approach".

Plastic Busters is the first project at basin scale that binds the Southern and Northern Mediterranean countries on the issue of Marine Litter under the umbrella of UNEP/MAP and UfM, with 19 countries already involved in the project and 12 countries endorsing the project.

Diagnosis of the problem to identified specific solutions

- Impact on Biodiversity?
- Impact on Fisheries?
- Identification of Hot spot areas?
- Impact on Human?

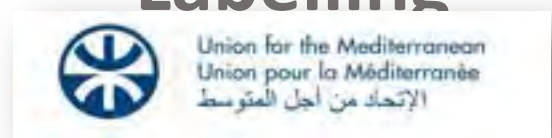
Project coordinator
Maria Cristina Fossi
Biomarker Laboratory, University of Siena, Italy



SDSN-MED
Flagship project



UfM
Labelling



MED-Interreg



ENI -CBC



2013

2016

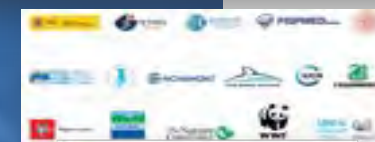
2018

2019 - 20



Plastic Busters MPAs:

preserving biodiversity from
plastics in Mediterranean
Marine Protected Areas



MINISTERO DELL'AMBIENTE
E DELLA TUTELA DEL TERRITORIO E DEL MARE



5.055 M €

PROJECT
BUDGET

4.296 M €

ERDF / IPA

48 Months

PROJECT
DURATION

Interreg
Mediterranean

PLASTIC BUSTERS
MPAs

Project co-financed by the European
Regional Development Fund

Objective

The **Plastic Busters CAP** project will capture the results from relevant projects, **capitalize** upon and effectively **transfer knowledge and tools** that address the **entire management cycle of ML** -from monitoring and assessment to prevention and mitigation- in order to support concrete actions to **mitigate ML** on the science-policy-society in the **entire Mediterranean basin**.



Plastic Busters CAP: outputs overview

The main expected achievements of the project are:

- ✓ 4 national hands-on training activities on marine litter monitoring and assessment
- ✓ 1 e-course on marine litter monitoring and assessment
- ✓ 4 pilot marine litter monitoring and assessment campaigns
- ✓ 4 national hands-on training activities on marine litter prevention and mitigation measures
- ✓ 1 e-course on marine litter prevention and mitigation measures
- ✓ 4 demos showcasing marine litter prevention and mitigation measures
- ✓ 1 roadmap on marine litter policy priorities
- ✓ 1 coastal cities network for a litter-free Mediterranean



WP3 activities

Within this WP available knowledge and **best practices** that address the **entire management cycle of marine litter** from **monitoring and assessment to prevention and mitigation** will be transferred and piloted.

- ✓ **Two training programmes** (including tailor-made training packages and capacity building workshops) will be designed and implemented, one dealing with **marine litter monitoring**, while the second will focus on **mitigation measures**.
- ✓ Furthermore **pilot monitoring and assessment campaigns** for marine macro- and microlitter in all marine compartments (**beach, sea surface, seafloor, biota**) will be performed in **4 locations in Egypt, Jordan, Lebanon and Tunisia**.



Aim of the Training

- ✓ First person event - is intended to transfer knowledge gained on **harmonized ML monitoring approaches** and methodologies to **MPA managers, staff members of Sea-Turtle rescue centres , Project Partners**, interested in developing skills on how to design an effective **ML monitoring programme**, consistent with the MSFD and the Barcelona Convention frameworks.
- ✓ This first session is dedicated to explaining the basics of ML monitoring and it provides **an overview on the methodologies and approaches to monitor ML presence on beaches, sea surface, as in biota and the ML impact on living organisms** and the type of results and indications that can be drawn from such monitoring.
- ✓ **Train personnel in the 4 countries who will be responsible for the 4 national hands-on training activities on marine litter monitoring and assessment (Plastic Busters CAP).**



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Target Audience

- ▶ **MPA managers and staff, Sea-Turtle rescue centres**
- ▶ **Other interested parties:**

Local public authority, Regional public authority
National public authority, Interest groups
including NGOs Higher education and research
International organisation, EEIG

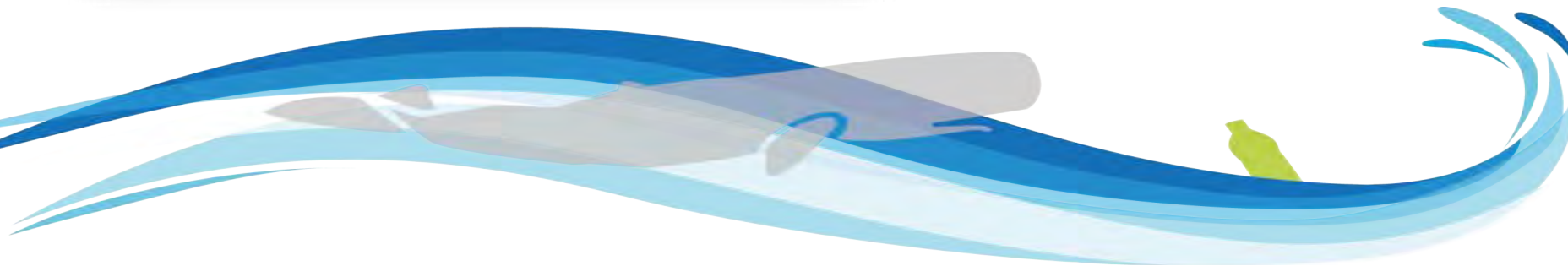


Plastic Busters MPAs:

Whole Management Cycle Of Marine Litter



- **PlasticBusters MPAs**, is a 4-year-long project Interreg Mediterranean funded project aiming to contribute to **maintaining biodiversity and preserving natural ecosystems** in pelagic and coastal **marine protected areas (MPAs)**, by defining and implementing a **harmonized approach** against marine litter.
- The project entails actions that address the **WHOLE MANAGEMENT CYCLE OF MARINE LITTER**, from **monitoring and assessment** to **prevention and mitigation**, as well as actions to **strengthen networking** between and among pelagic and coastal MPAs located in Italy, France, Spain, Croatia, Albania and Greece.
- The project will support the **implementation** of the **MSFD** and the Barcelona Convention **Regional Plan on Marine Litter Management** in the Med.



Plastic Busters MPAs:

Harmonized Diagnosis in the Environment

4.1 – Coordinating WP 4

4.2

Piloting harmonized ML monitoring in Med MPAs to assess ML (macro- and micro-plastics) in the coastal and pelagic environment

4.3

Piloting harmonized ML monitoring approaches in Med MPAs and hotspots to establish the impacts on biota, including endangered species and fishery resources

4.4

Testing the ML forecasting model

4.5

Preparation of the demo projects

4.6

Piloting ML prevention and mitigation measures

Macroplastics



Joint list - MSFD

Microplastics



MARINE LITTER MONITORING



Project co-financed by the European Regional Development Fund

Plastic Busters MPAs:

Harmonized Diagnosis in Biota

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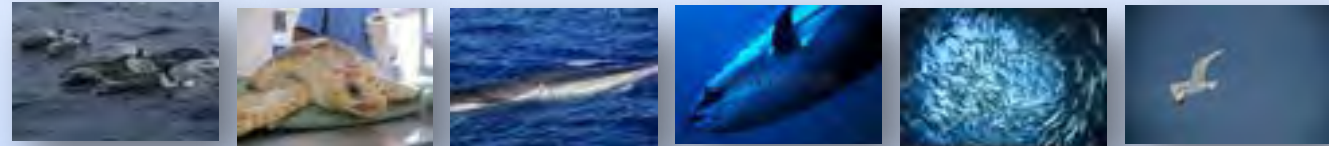
Testing the ML forecasting model

4.5

Preparation of the demo projects

4.6

Piloting ML prevention and mitigation measures



MARINE LITTER IMPACTS ON BIOTA

Bioindicator selection in relation to habitat/home range



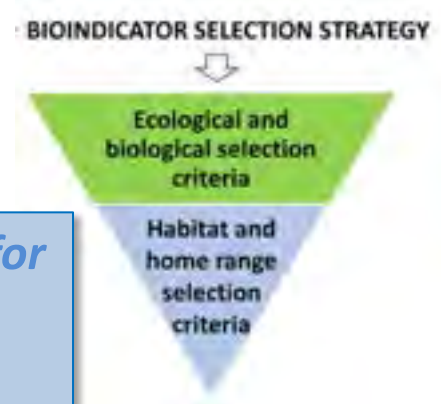
Basin Scale



	SEA SURFACE	COASTAL WATERS	OPEN WATERS	SEAFLOOR	COAST LINE AND BEACH SEDIMENT
BASIN SCALE (Mediterranean Sea)	<i>Calonectris diomedea</i> , <i>Puffinus yelkouan</i>	<i>Calonectris diomedea</i> , <i>Puffinus yelkouan</i>	<i>Balaenoptera physalus</i> ; <i>Cetorhinus maximus</i> <i>Xiphias gladius</i> ; <i>Thunnus thynnus</i> <i>Xiphias gladius</i> ; <i>Thunnus thynnus</i> <i>Caretta caretta</i> <i>Physeter macrocephalus</i>		
MEDIUM-SCALE (Mediterranean UN Environment/MAP sub-regions)			<i>Thunnus alalunga</i> <i>Sphyrna hippurus</i> <i>Caretta caretta</i> <i>Thunnus alalunga</i>		
SMALL-SCALE (FAO GSA)		<i>Boops boops</i> <i>Trachinotus ovatus</i>	<i>Maurolicus muelleri</i> <i>Engraulis encrasicolus</i> <i>Sardina pilchardus</i> <i>Myctophids</i>	<i>Mullus barbatus</i> <i>Merluccius merluccius</i> <i>Galeus melastomus</i> , <i>Merluccius merluccius</i> , <i>Solea spp.</i> <i>Galeus melastomus</i> , <i>Scyliorhinus canicula</i>	
LOCAL SCALE			<i>Holothurians</i>		<i>Mytilus galloprovincialis</i> <i>Arenicola marina</i> Decapods (e.g. <i>Carcinus sp.</i>)

BLUE: bioindicator for macrolitter

RED: bioindicator for microplastics



Local Scale



Plastic Busters MPAs:

Three Fold Monitoring Approach in Biota

Commercially harvested species



Invertebrates



Vertebrates

Endangered species



Stranded organisms



Free-ranging animals

i) Plastic detection

- Analysis of the ingested marine litter/microplastics:
 - Occurrence (N)
 - Abundance (n°)
 - Weight (g)
 - Polymer analysis

ii) Plastic tracers detection

- Analysis of plastic additives:
 - Phthalates
 - PBDEs
 - Bisphenol A
- Analysis of PBT compounds:
 - PCBs
 - DDTs
 - PAHs
 - Mercury

iii) Biomarkers detection

- Effects at molecular level:
 - Measures of DNA damage
 - Alterations of gene expression
 - Alteration of proteins
- Effects at cellular level:
 - Alteration of cell functions
- Effects at tissue level:
 - Histological and histopathological alterations



Plastic Busters MPAs activities in MPAs

Risk Assessment - From Diagnosis to Mitigations



WP4 -Testing

- Pelagos Sanctuary (IT,FR,MC)
- Tuscan Archipelago (IT)
- Zakynthos National Marine Park (GR)
- Parque Nacional Del Archipiélago De Cabrera (SP)

WP5 – Transferring

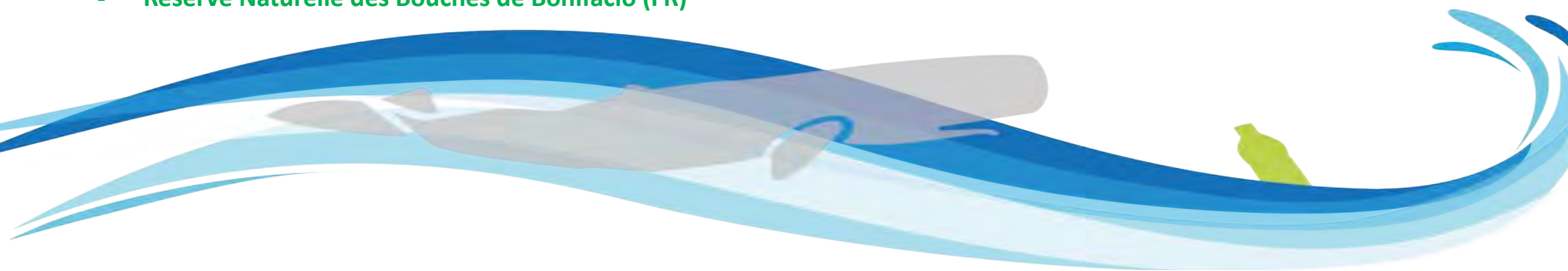
- Karaburun-Sazan MPA (AL)
- Capo Milazzo MPA (IT)
- Brijuni National Park(HR)
- Reserve Naturelle des Bouches de Bonifacio (FR)



Diagnosis



Mitigation



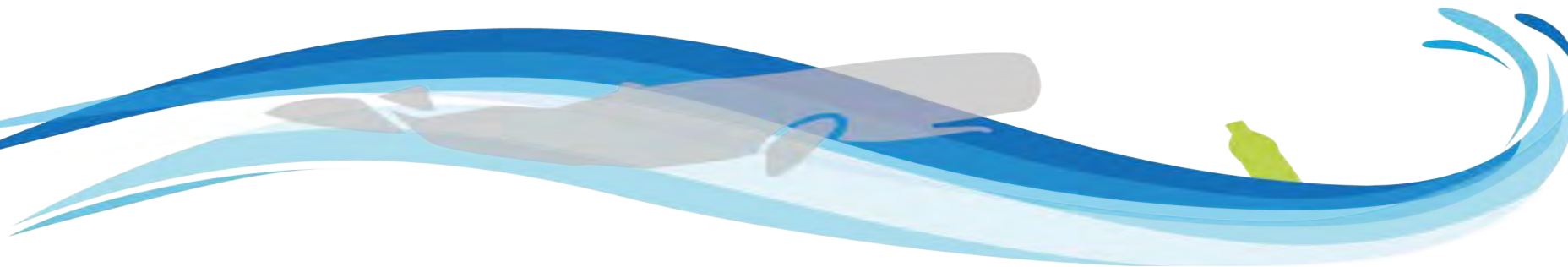
Plastic Busters MPAs:

Joint strategy for monitoring marine litter and its impact on biodiversity in Mediterranean MPAs & selected monitoring methodologies



The harmonized monitoring protocols are described in detail in the thematic chapters subdivided in the following methodological sections:

- a. **SURVEY DESIGN:** this section describes how the survey will be planned in the different MPAs according to MPAs extension
- b. **SAMPLING METHODOLOGY:** this section describes how the sampling should be performed in all the environmental compartments as well as biota and the methodologies to be used
- c. **SAMPLE PROCESSING METHODOLOGY:** this section describes how the samples should be processed and how data should be analysed and reported.



Plastic Busters MPAs Final Conference
Athens, 12-13 April 2022

Interreg
Mediterranean
PLASTIC BUSTERS
MPAs

UNIVERSITÀ
DI SIENA 1340

ISTRA

CMIS-0



Transferring in *COMMON* and Plastic Busters CAP

Plastic Busters CAP



Toolkit/Protocol for monitoring *Marine litter*



E-learning modules





ENI
CBCMED
Cooperating marine facilities
in the Mediterranean



Project funded by the
EUROPEAN UNION



REGIONE AUTONOMA DI SICILIA
REGIONE AUTONOMA DELLA SARDEGNA



Plastic Busters CAP

Plastic Busters MPAs: Monitoring *Transferring in Plastic Busters CAP*



MONITORING MACRO-
AND MICROLITTER IN THE
ENVIRONMENT



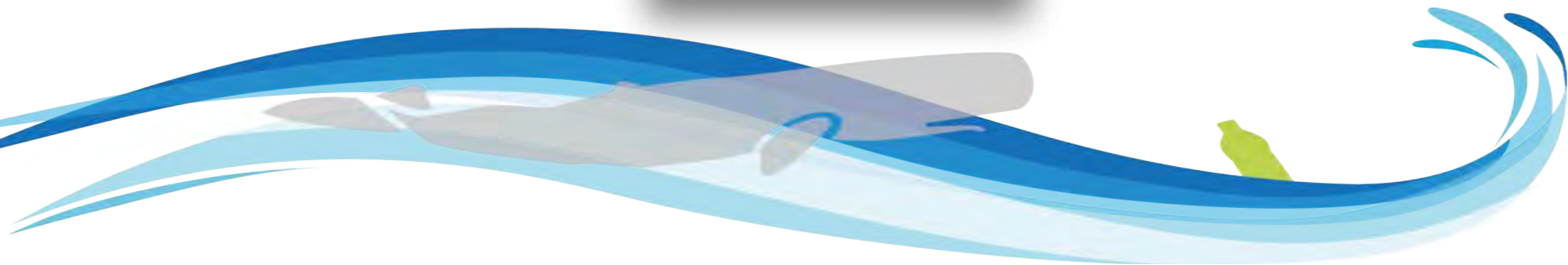
MONITORING MACRO-
AND MICROLITTER IN BIOTA



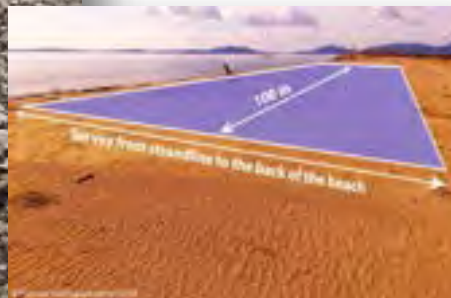
Plastic Busters MPAs: Toolkit – Supporting documents



...and PB MPAs results



Monitoring MACROLITTER on beaches



1. Methodology for monitoring MACROLITTER on beaches

This document describes the methodological approach for monitoring macrolitter on beaches. It has been compiled based on the related methodologies developed within the IPA-Adriatic DeFishGear project and it has been adopted within the framework of the Interreg Med PlasticBusters MPAs project to address the recent advances in the field.

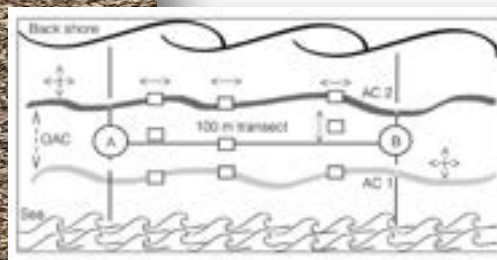
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THE INTERREG MED
PLASTIC BUSTERS MPAs PROJECT

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MPAs

Monitoring MICROLITTER in beaches sediments



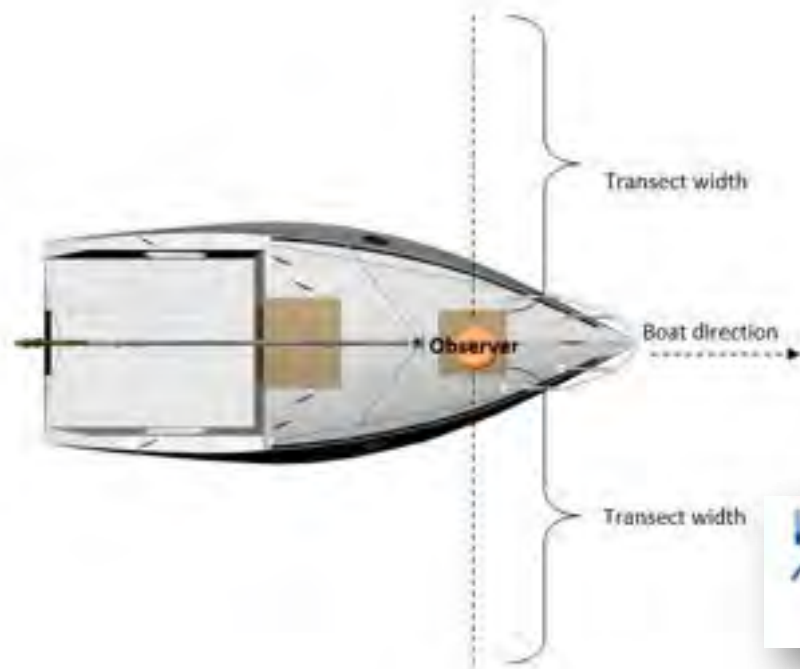
3. Methodology for monitoring MICROLITTER in beach sediments

This document describes the methodological approach for monitoring microlitter on beaches. It has been compiled based on the related methodologies developed within the IPA-Adriatic DefishGear project and the JPI-Oceans BASEMAN project and it has been adopted within the framework of the Interreg Med PlasticBusters MPAs project to address the recent advances in the field.

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Monitoring MACRO-LITTER on sea-surface

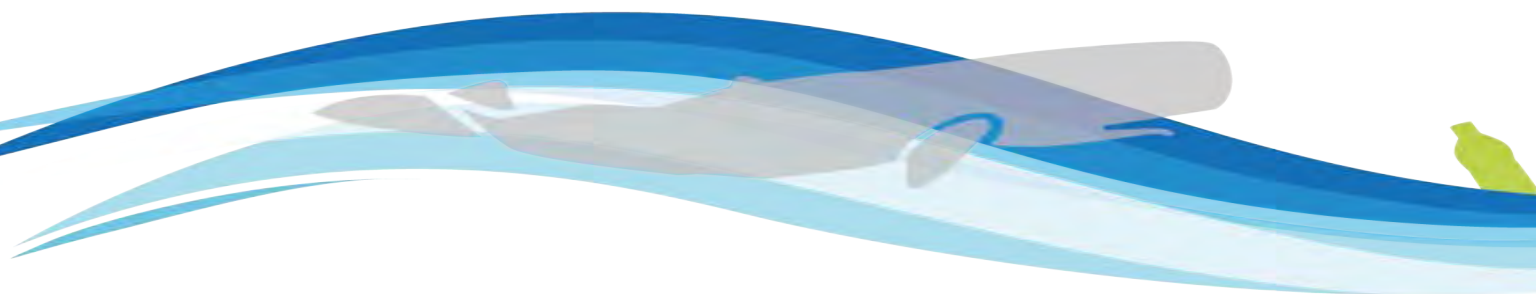


5. Methodology for monitoring MACROLITTER on the sea surface with visual observation by small and medium-sized vessels

This document describes the methodological approach for monitoring macro-litter on the sea surface. It has been compiled based on the related methodologies developed within the IPA-Adriatic DeFishGear and the Interreg Med MEDSEALITTER projects and it has been adapted within the framework of the Interreg Med PlasticBusters MPAs project to address the recent advances in the field.

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PLASTIC BUSTERS MPAs PROJECT



Monitoring MICROLITTER on sea-surface



6. Methodology for monitoring MICROLITTER on the sea-surface using manta net tows

This document describes the methodological approach for monitoring microlitter on the sea surface. It has been compiled based on the related methodologies developed within the iPA-Adriatic DeFishGear project as well as other EU projects and the scientific literature, and it has been adopted within the framework of the Interreg Med PlasticBusters MPAs project to address the recent advances in the field.

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PLASTIC BUSTERS MPAs PROJECT

Monitoring MACRO and MICROLITTER in BIOTA: INVERTEBRATE



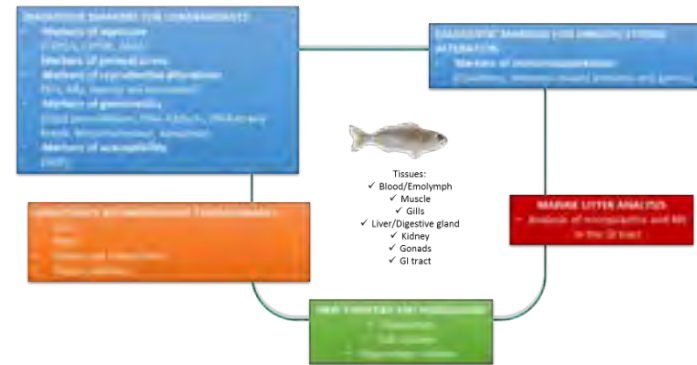
10. Methodology for monitoring MACROLITTER and MICROLITTER ingestion in biota: invertebrates

This document describes the methodological approach for monitoring macro litter and micro litter ingestion in invertebrates. It has been compiled based on the related methodologies developed within the IPA-Adriatic DeFishGear project and the Interreg Med MEDSEALITTER project, and it has been adapted within the framework of the Interreg Med PlasticBusters MPAs project to address the recent advances in the field.

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A large pile of fresh, whole fish, likely sea bream or similar, with silvery scales and reddish-orange hues, displayed on a white surface.



This document describes the methodological approach for monitoring macro-litter and micro-litter ingestion in fish species. It has been compiled based on the related methodologies developed within the IPA-Adriatic DefishGear project and the Interreg Med MEDSEALITTER project, and it has been adopted within the framework of the Interreg Med PlasticBusters MPAs project to address the recent advances in the field.

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PLASTIC BUSTERS MPAs PROJECT

Monitoring MACRO and MICROLITTER in BIOTA: ENDANGERED SPECIES



12. Methodology for monitoring MACROLITTER and MICROLITTER ingestion in biota: sea turtles

This document describes the methodological approach for monitoring macrolitter and microlitter ingestion in sea turtles. It has been compiled building on the methodologies developed within the EU-funded INDICIT project and the marine litter monitoring guidance documents of the MSFD TS10 and LINER/MAP and it has been adapted within the framework of the Interreg Med PlasticBusters MPAs project to address the recent advances in the field.

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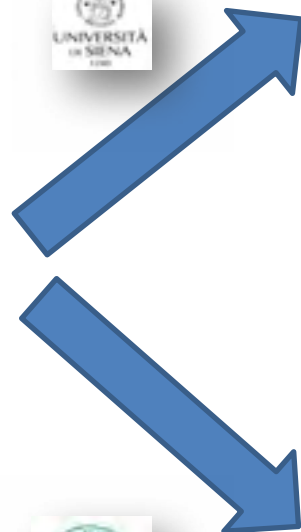
Plastic Busters CAP: next steps

The main expected achievements of the project are:

- ✓ **4 national hands-on training activities on marine litter monitoring and assessment**
- ✓ **1 e-course on marine litter monitoring and assessment**
- ✓ **4 pilot marine litter monitoring and assessment campaigns**



PB MPAs: how are we transferring?



Harmonized ML monitoring approaches

- Regional cap. building/training event (Manfredonia - On-site activities)

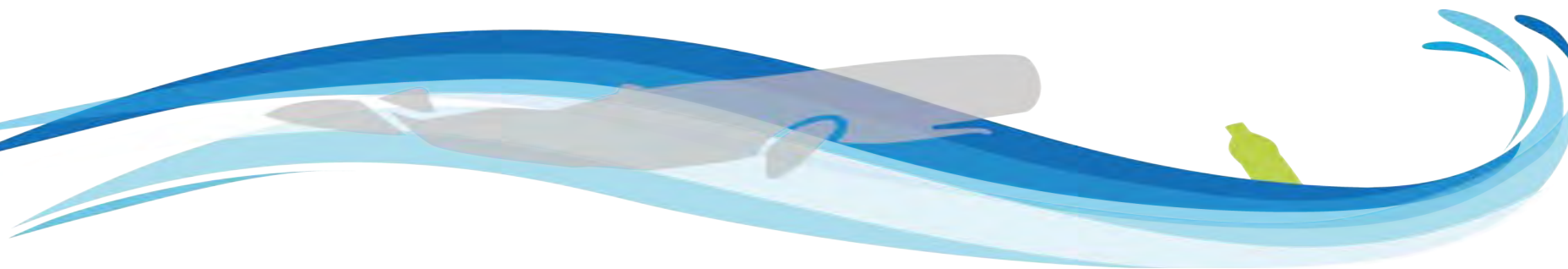


- **Monitoring Protocol**
- **E-learning module**



ML mitigation measures

- **Measures Protocol**
- **E-learning module**



SAMPLING STARTER KIT



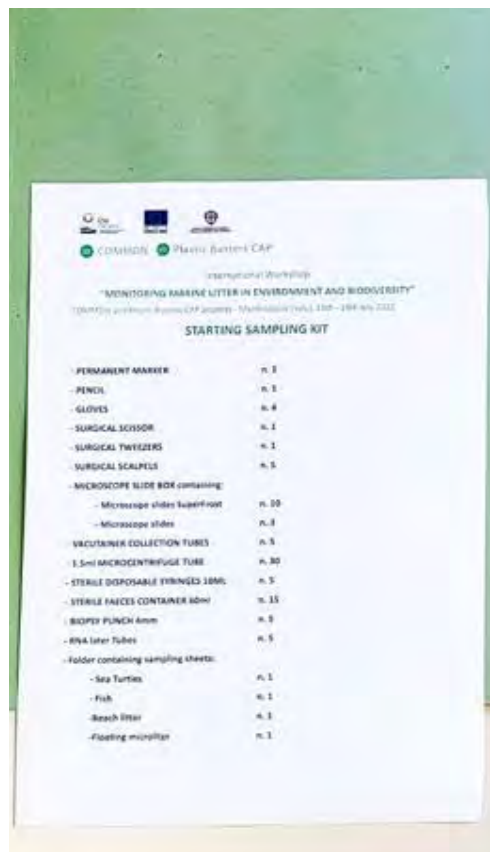
How are we transferring?

SAMPLING SHEET

How are we transferring?

Folder containing sampling sheet:

- Live Sea Turtles n. 1
- Stranded Sea Turtles n. 1
- Fish n. 1
- Beach macro and micro litter n. 1
- Floating macrolitter n. 1
- Floating microlitter n. 1
- Joint list of Marine Macrolitter Items n. 1
- Classification of Marine Litter ingested items n.1





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for tackling marine litter in Mediterranean Sea



COMMON



Plastic Busters CAP

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Manfredonia (Italy), 12th - 14th July 2022



Welcome in Manfredonia with us!



Union for the Mediterranean
Union pour la Méditerranée
الاتحاد من أجل المتوسط



Mediterranean



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