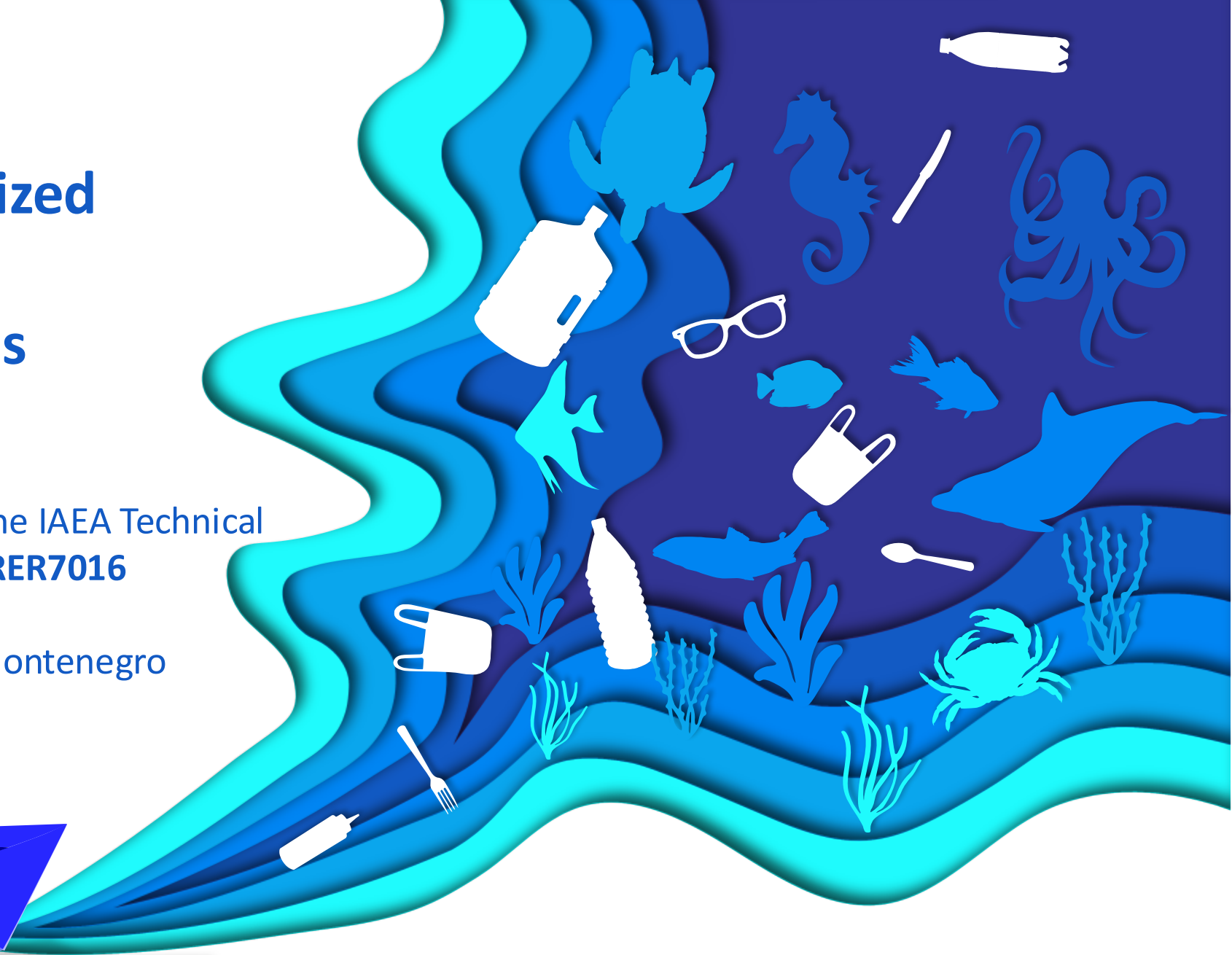
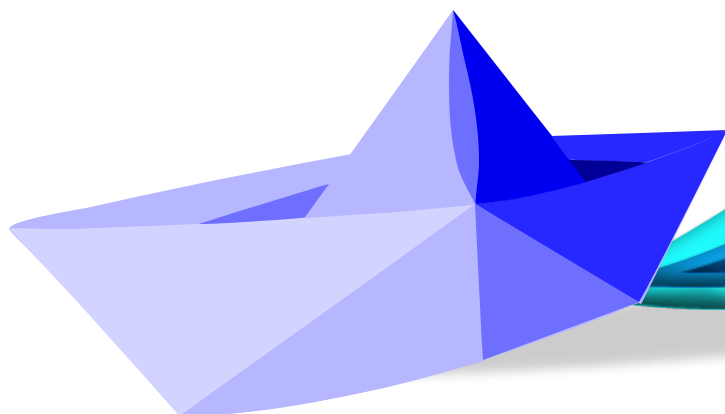


Coastal microplastic monitoring: Harmonized protocols for sampling and analysis

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So much plastic pollution!!!!!!

14th International SedNet Conference "Healthy Sediments" 6-10 October 2025, Madrid, Spain

➤ Among the many environmental challenges we face today, plastic pollution is emerging as one of the most serious.

➤ According to projections, by 2025 the ocean will contain one tonne of plastic for every three tonnes of fish, and by 2050, there may be more plastic in the ocean than fish.

➤ Plastic waste is not only infiltrating our oceans but also entering the human body in the form of microplastics.

➤ Without urgent action, the amount of plastic entering the ocean each year could reach 37 million metric tons by 2040, according to UN estimates, posing a severe threat to both marine and human life.



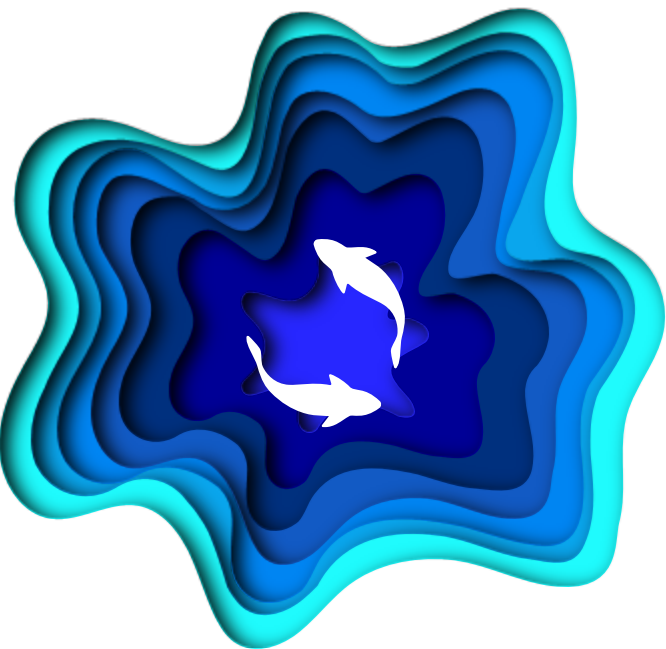
NUTEC PLASTIC

NUTEC Plastics is the IAEA's flagship initiative to tackle the global challenge of plastic pollution, using nuclear science and technology in two key ways:

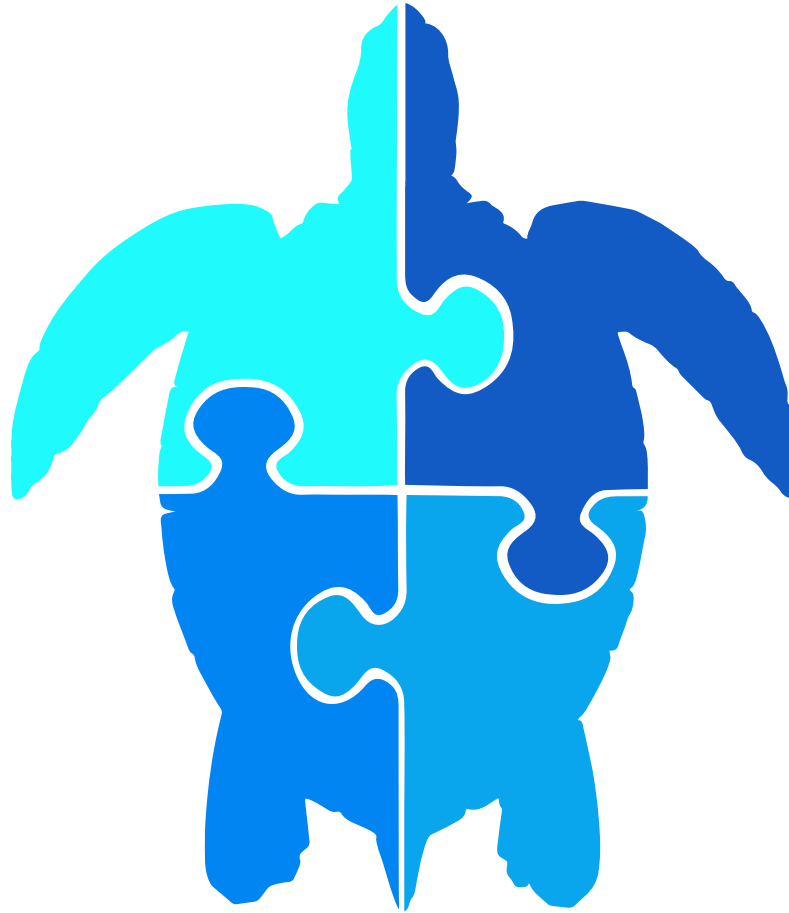
- Recycling plastic using radiation technology
- Monitoring marine plastic using nuclear techniques.



- A survey analysis conducted under project **RER7016**, within the framework of the **NUTEC Plastics** initiative, focused on plastic pollution monitoring.
- The survey revealed that MSs are not sufficiently aware of the comparative advantages of nuclear technologies in monitoring MP pollution.
- The project aims to support MSs in developing competencies for MP monitoring and strengthening their capabilities in using nuclear techniques to assess pollution in beach sands and seawater.



Through the IAEA's NUTEC Plastics initiative, 99 countries are participating in marine monitoring of microplastics, and 52 around the world are developing innovative recycling technology.



Marine monitoring

Using nuclear and derived methods, the IAEA will support marine laboratories to generate scientific knowledge on the impacts of plastic pollution in coastal and marine ecosystems. Specialized techniques are applied to accurately track and quantify the movement and effects of microplastic particles and their associated co-contaminants. This enables researchers to:

Determine

the status and trends of marine plastic particles in sediment, water and biota in the coastal ocean.

Assess

marine plastic bioaccumulation pathways and impacts on valuable marine animals.

Develop

risk scenarios using this newly generated, science-based information for informed decision making.

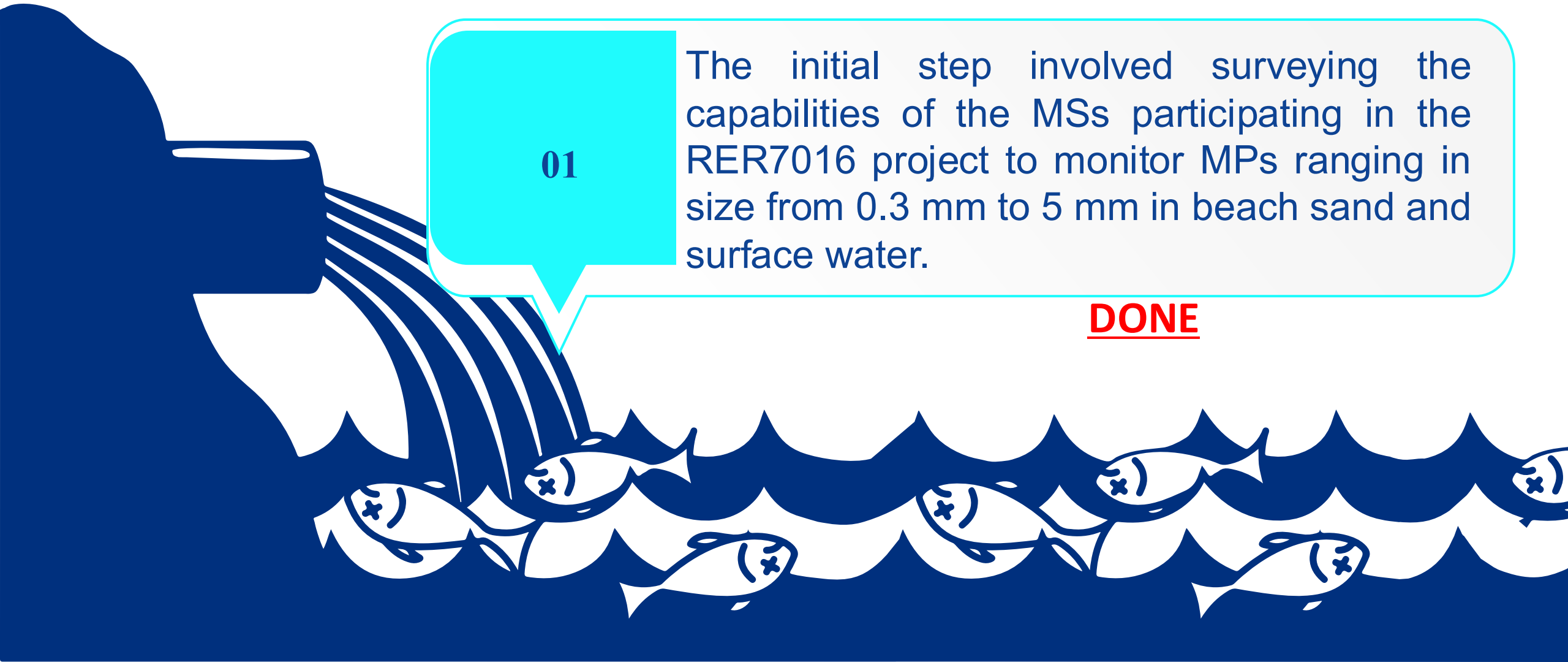


RER 7016 Actions:

01

The initial step involved surveying the capabilities of the MSs participating in the RER7016 project to monitor MPs ranging in size from 0.3 mm to 5 mm in beach sand and surface water.

DONE



01



Lack of harmonized methodologies and standardized protocols for sampling and analysis of MPs in water, beach sand, sediment, and biota.

Significant disparities in the capacity of national laboratories across the region to conduct MP sampling and analysis.



02

03



Limited availability of essential equipment for effective MP sampling and laboratory analysis.

Insufficient training and low technical expertise among personnel involved in MP monitoring in coastal environments.



04

RER 7016 Actions:

- Conduct a workshop on regional harmonization of protocols for sampling and analyzing microplastics (MPs; 0.3-5mm).

02

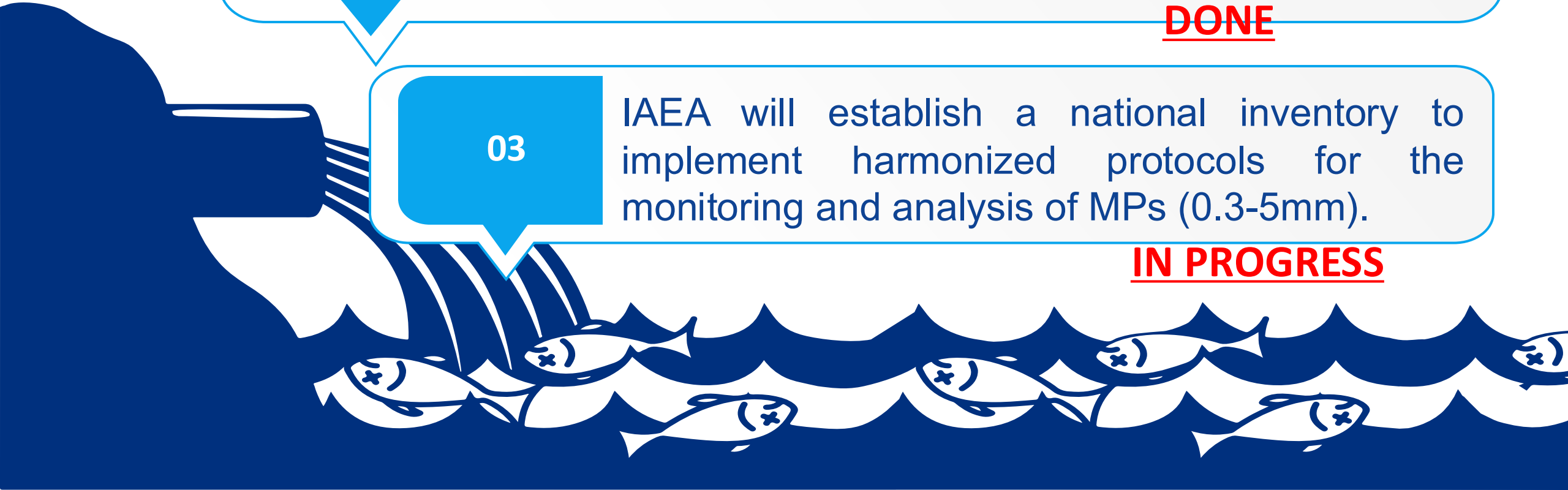
Laboratories (15) were classified from basic to advanced level by the criteria defined within the IAEA initiative NUTEC.

DONE

03

IAEA will establish a national inventory to implement harmonized protocols for the monitoring and analysis of MPs (0.3-5mm).

IN PROGRESS



RER 7016 Actions:

- RTC on strategies for monitoring microplastics (MPs; 0.3-5mm) in coastal areas.

03

RER7016-EVT2406818, Regional Training Course on Strategies and Design of Microplastics Monitoring Programmes from 20 to 31 October 2025 in Kotor, Montenegro

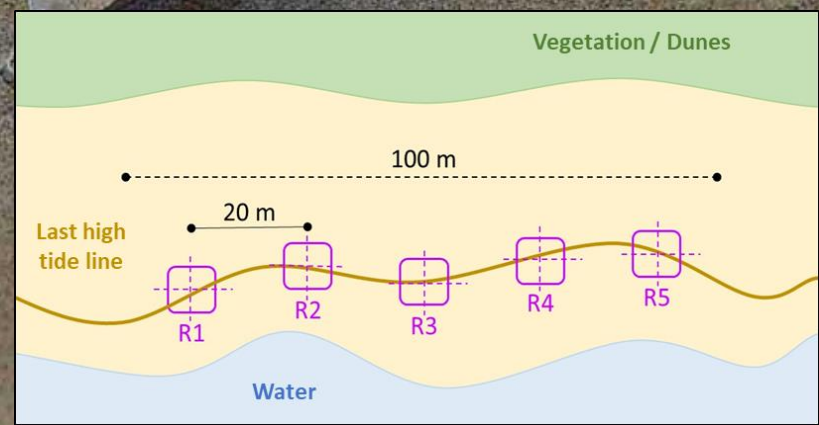
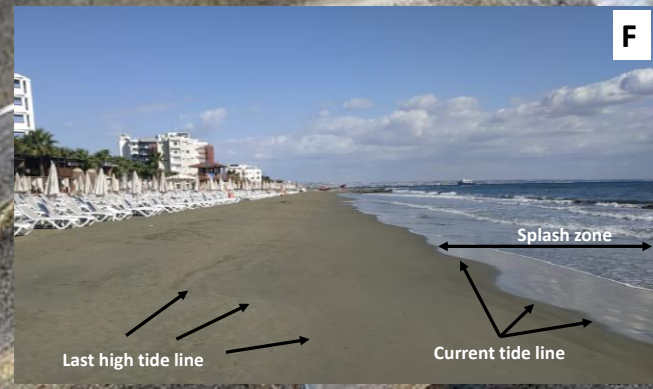
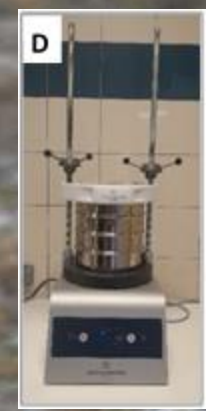
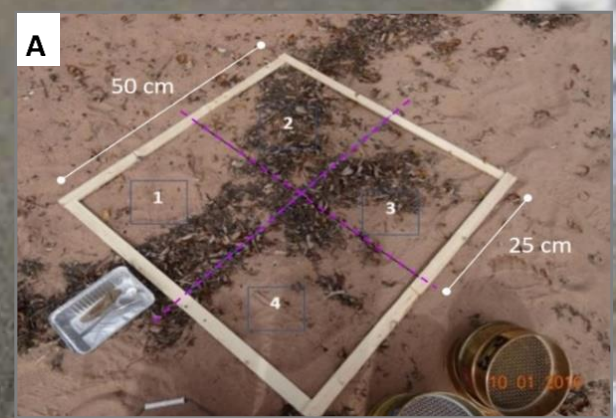
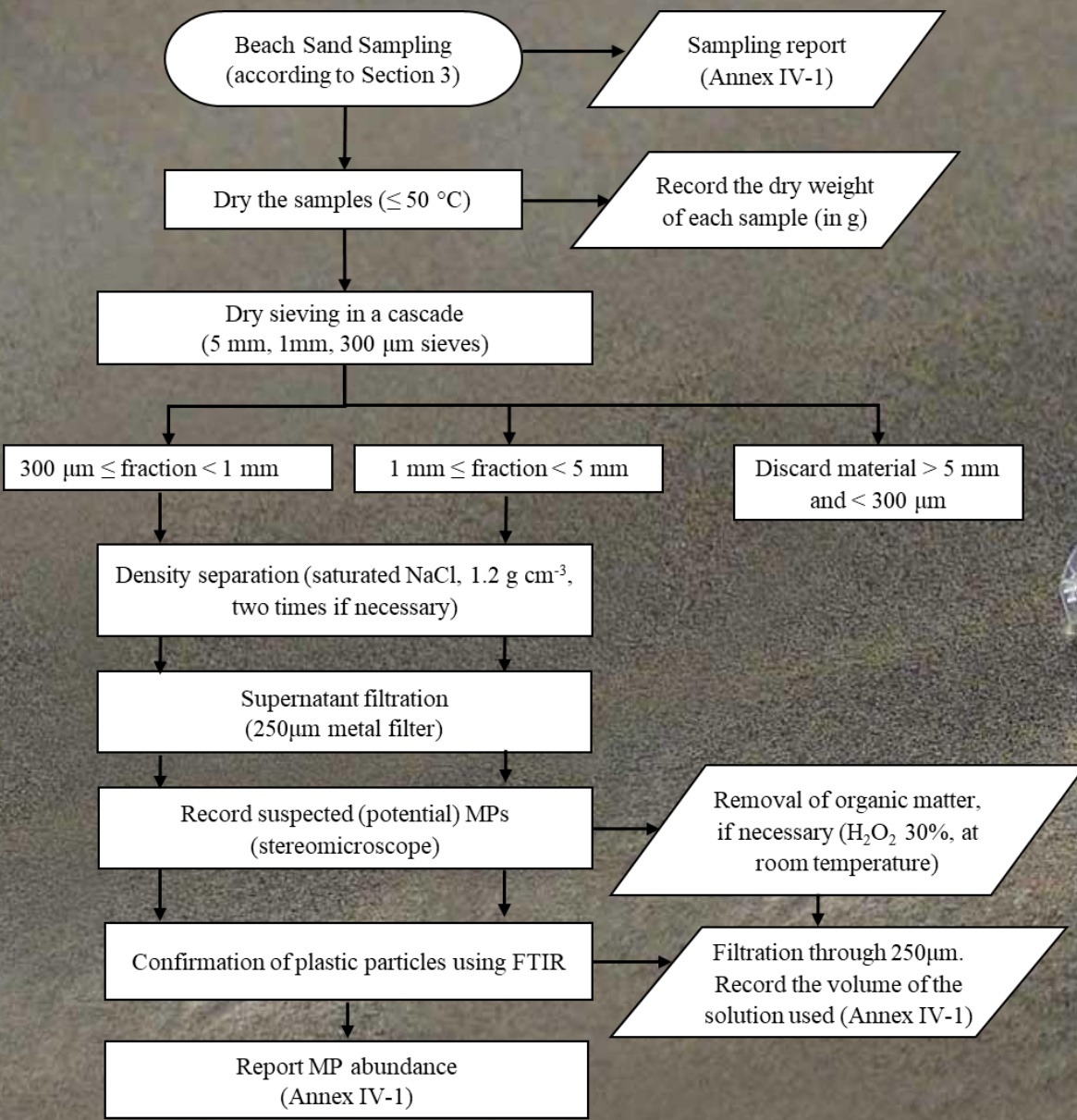
THIS MOUNT

04

Carry out a proficiency test in microplastics analysis (MPs; 0.3-5mm) at national laboratories.

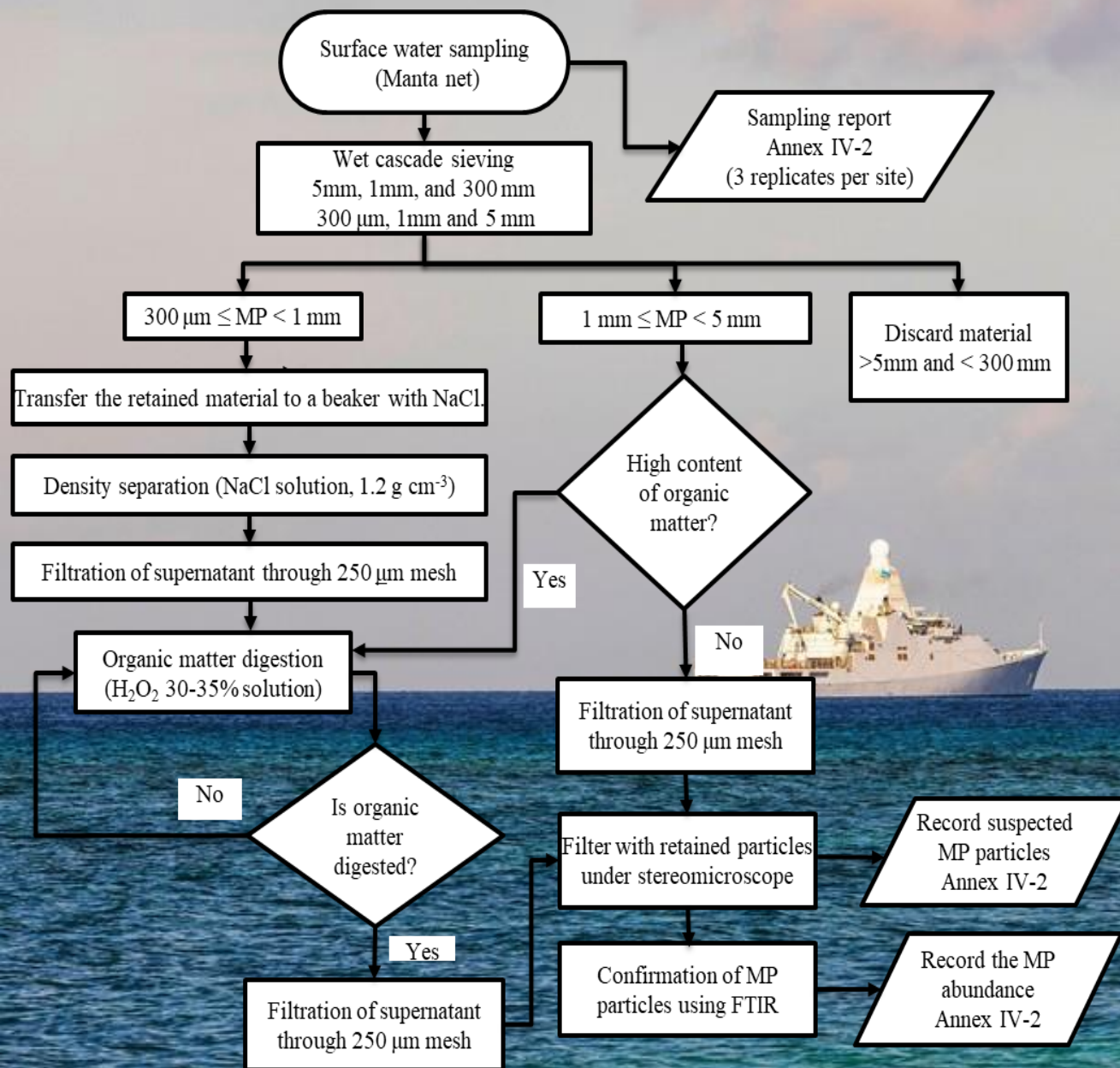
NEXT YEAR



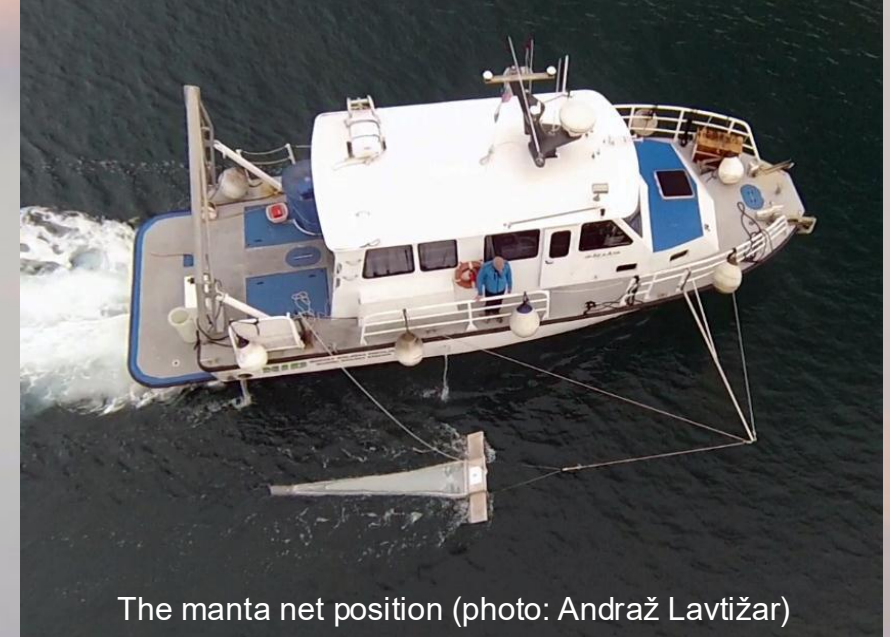


Flow diagram of the procedure for determining the abundance of MPs in beach sands.

Definition of the sand sample collection area along the most recent high tide line (100 m transect) and sampling points (R1 to R5) on the beach



Flowchart of the procedure for determining the abundance of floating MPs in marine surface waters



Polymer Identification



- Place each particle on the sample area for the ATR
- Report the quantity and various types of plastics identified.



FT-IR Spectrometers

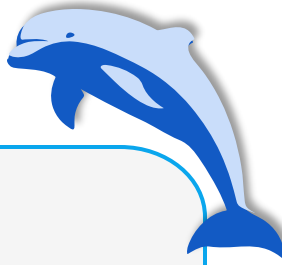


The Agilent 8700 Laser Direct Infrared Chemical Imaging System

Harmonized protocol among participating laboratories for the monitoring of microplastics in selected matrices (References)

- Guidelines for the Monitoring and Assessment of Plastic Litter in the Ocean (GESAMP, 2019)
- Conceptual guidelines for the application of Marine Spatial Planning and Integrated
- Coastal Zone Management approaches to support the achievement of Sustainable Development Goal Targets 14.1 and 14.2 (UNEP, 2018)
- Microplastic beach protocol
https://www.epa.gov/system/files/documents/2021-09/microplastic-beach-protocol_sept-2021.pdf
- Harmonization of Microplastics Monitoring Methodologies in the Ocean
https://www.env.go.jp/en/water/marine_litter/method.html

RER 7016 Actions:

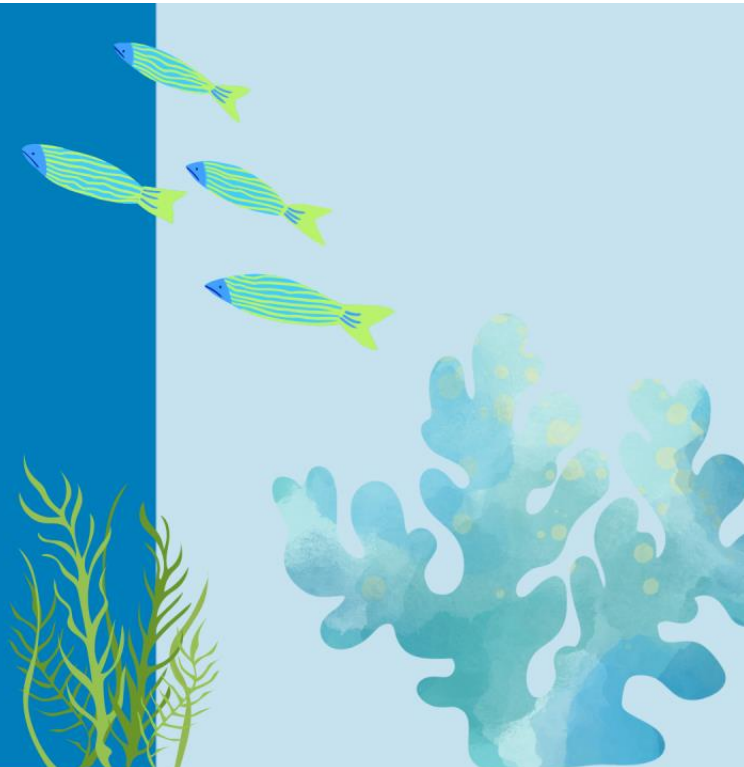


05

Regional workshop to discuss national results and the development of a regional product on the historical trend of microplastic pollution in the coastal zones of the region.

NEXT YEAR

14 LIFE
BELOW WATER



Data have the potential to
contribute to achieving
SDG 14: Life Below Water.

Stop Ocean Plastic Pollution



THANK YOU