



DeFishGear

# DeFishGear Project, Strategy of Marine litter in Adriatic region

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Agricultural University of Tirana, Albania

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The Project is co-funded by the European Union,  
Instrument for Pre-Accession Assistance (IPA)



# Partnership of DeFishGear



## Slovenia

National Institute of Chemistry - **LB**

Institute for water of the Republic of Slovenia - **FB5**

University of Nova Gorica - **FB6**

PlasticsEurope AISBL - **ASS1**

Ministry of Agriculture and the Environment - **ASS2**

## Italy

ISPRA - **FB1**

Ca' Foscari University of Venice - **FB2**

Mediterranean Consortium - **FB3**

ARPA Emilia Romagna - **FB4**

Euro-Mediterranean Center on Climate Change (CMCC) - **FB15**

Italian Ministry of Environment, Land and Sea- **ASS3**

Fishing League - **ASS5**

## Croatia

Institute for Oceanography and Fisheries - **FB7**

Public Institution RERA s.d. For coordination and development of Split Dalmatia County (RERA) - **FB14**

Croatian Environment Agency- **ASS4**

## Bosnia and Herzegovina

Hydro-Engineering Institute of the Faculty of Civil Engineering - **FB8**

Agency for watershed of Adriatic Sea Mostar- **ASS6**

## Montenegro

University of Montenegro, Institute of marine biology - **FB9**

## Albania

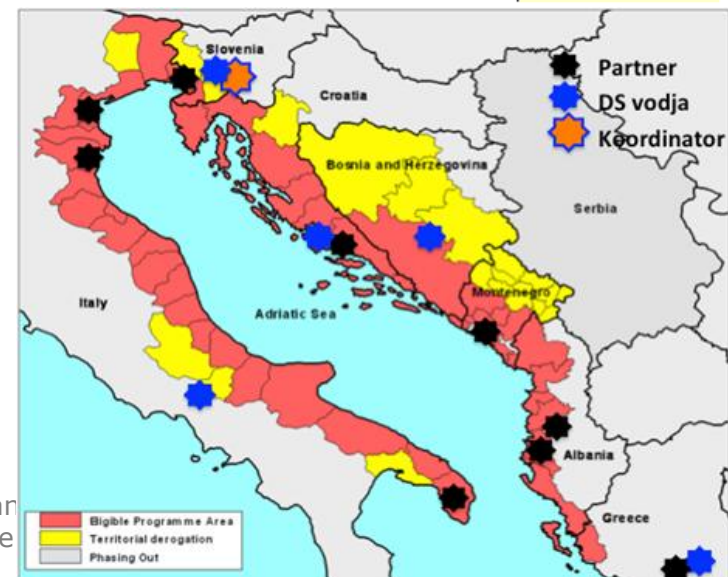
Agricultural University of Tirana, Laboratory of Fisheries and Aquaculture - **FB10**

Regional Council of Lezha - **FB11**

## Greece

Mediterranean Information Office for Environment, Culture and Sustainable Development - **FB12**

Hellenic Centre for Marine Research (HCMR), Institute of Oceanography - **FB13**



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# Key elements of the strategy DeFishGear



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## General Marine Litter Monitoring Approach, addressing key aspects related to the MSFD and the ECAP requirements

- Aim & objectives of monitoring
- Quality assessment & control approach
- Site selection strategy
- Data handling & reporting

## Monitoring of beach litter, floating litter, benthic litter, litter in biota and microplastics

- Survey design (selection of survey sites, number of sites, etc.)
- Sampling methodology/protocol
- Sample processing methodology
- Data analysis
- Key considerations





# DeFishGear protocols for macro litter monitoring



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**DeFishGear**  
www.defishgear.net

**Methodology for Monitoring  
Marine Litter on Beaches**  
Macro-Debris (>2.5cm)

Prepared by: Thomas Vlachogianni (MO-EC206)  
With contributions from: Vicky Paraskevas (MO-EC206), Vaggelis Katsourakis (MO-EC206),  
Andreas Patsikas & Stefan Trips (WIR), Stefano Di Muccio & Luigi Alcaro (SPRA),  
Cristina Mazzotti (ARPA), Christina Zeri & Eleni Kampari (HCMR)

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

Prepared by: Thomas Vlachogianni (MO-EC206)  
With contributions from: Francesca Randi, Tiziana Chianuzzi & Tommaso Fortibuoni (SPRA),  
Vicky Paraskevas (MO-EC206), Vaggelis Katsourakis (MO-EC206),  
Stefano Caputi & Luca Pavia & Andreas Patsikas (WIR)

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

Prepared by: Thomas Vlachogianni (MO-EC206) & Stella Sotomaior (HCMR)  
With contributions from: Francesca Randi, Tiziana Chianuzzi & Tommaso Fortibuoni (SPRA),  
Vicky Paraskevas (MO-EC206), Vaggelis Katsourakis (MO-EC206),  
Luca Pavia (WIR)

The project is co-funded by the European Union  
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**Methodology for Monitoring Marine Litter  
on the Seafloor (Shallow coastal waters (0-20m))**  
Visual surveys with SCUBA/snorkeling

Prepared by: Thomas Vlachogianni (MO-EC206) & Vaggelis Katsourakis (MO-EC206)  
With contributions from: Silvia Ruffo (WIR), Vassilis Mouton (MHR)

The project is co-funded by the European Union  
Instrument for Pre-Accession Assistance

**DeFishGear**  
www.defishgear.net

**PROTOCOL FOR MACRO LITTER INGESTED IN  
FISH STOMACHS**

ANASTASOPOULOU A., MYTILINEOU CH.

Hellenic Centre for Marine Research,  
Institute of Marine Biological Resources and Inland Waters  
February, 2015

It is co-funded by the European Union  
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# Objectives of the DeFishGear monitoring and assessment strategy

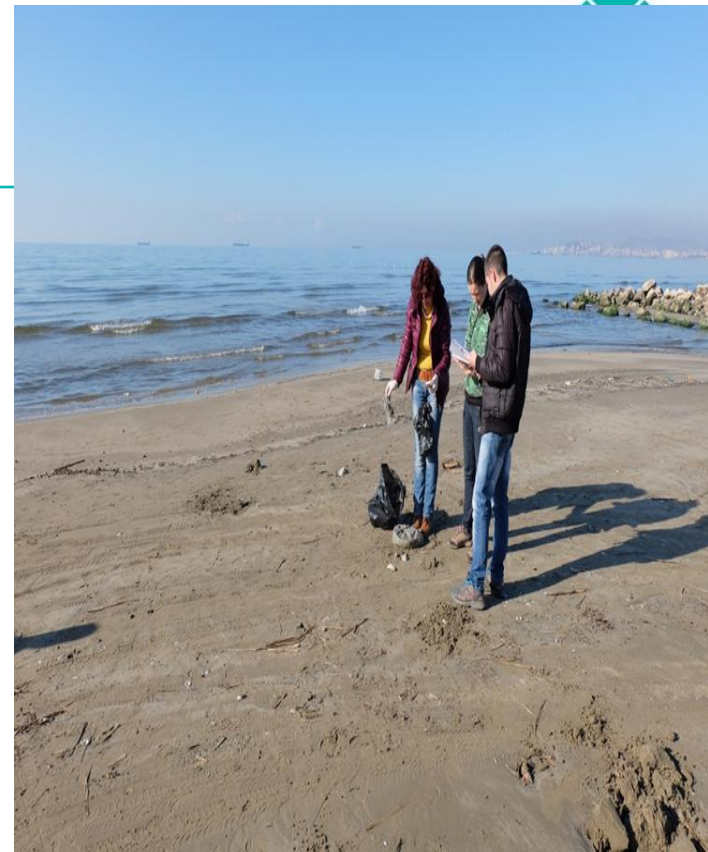
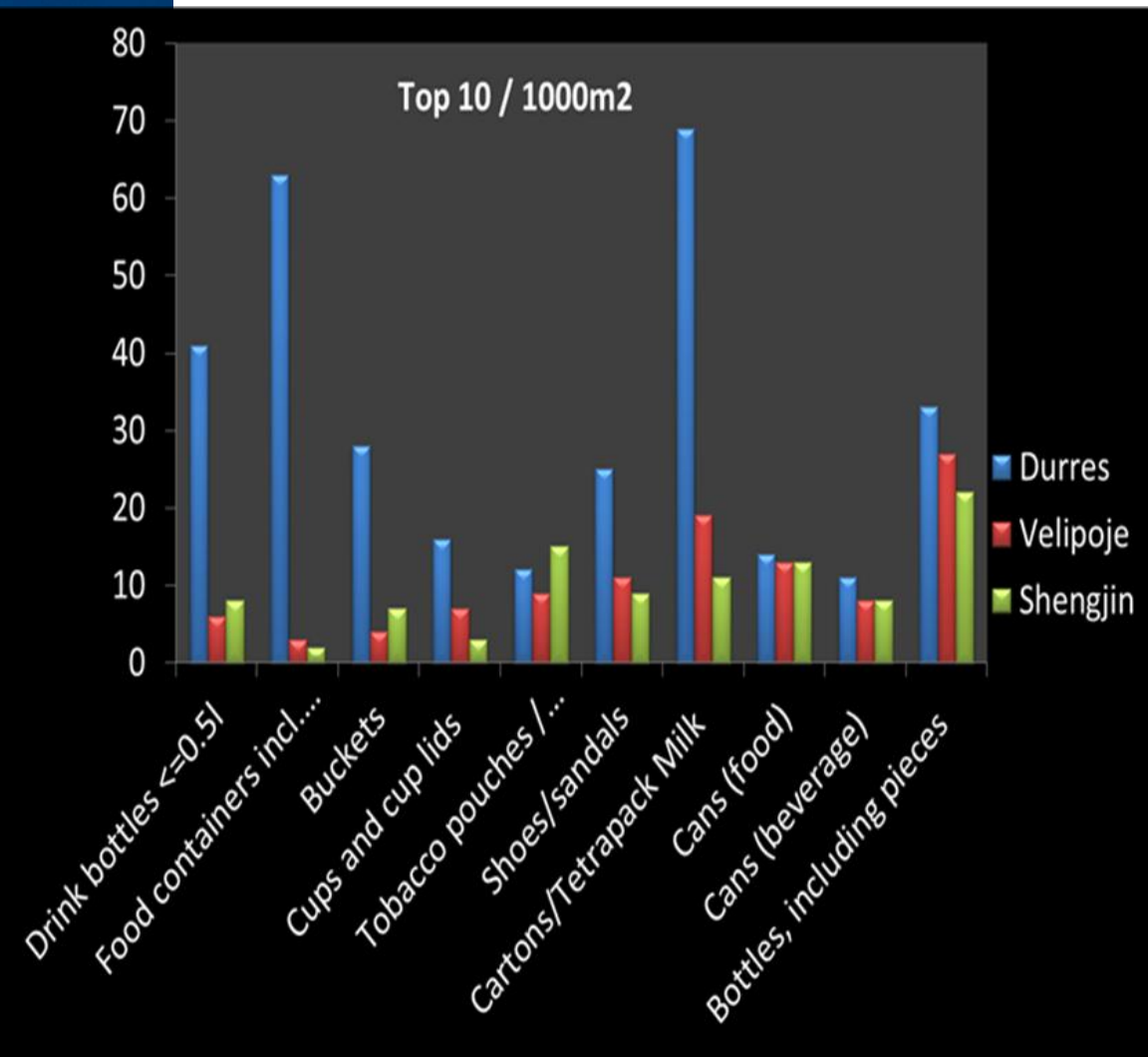


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- To provide a comprehensive, coherent and transparent characterization and analysis of the marine litter problem (including socio-economic aspects) in the Adriatic;
- To pave the way for the adoption of a coordinated and harmonized approach in terms of marine litter monitoring;
- To provide recommendations related to policy options in meeting regional and national objectives regarding marine litter (MSFD, ECAP);



# Marine litter in Albanian beaches

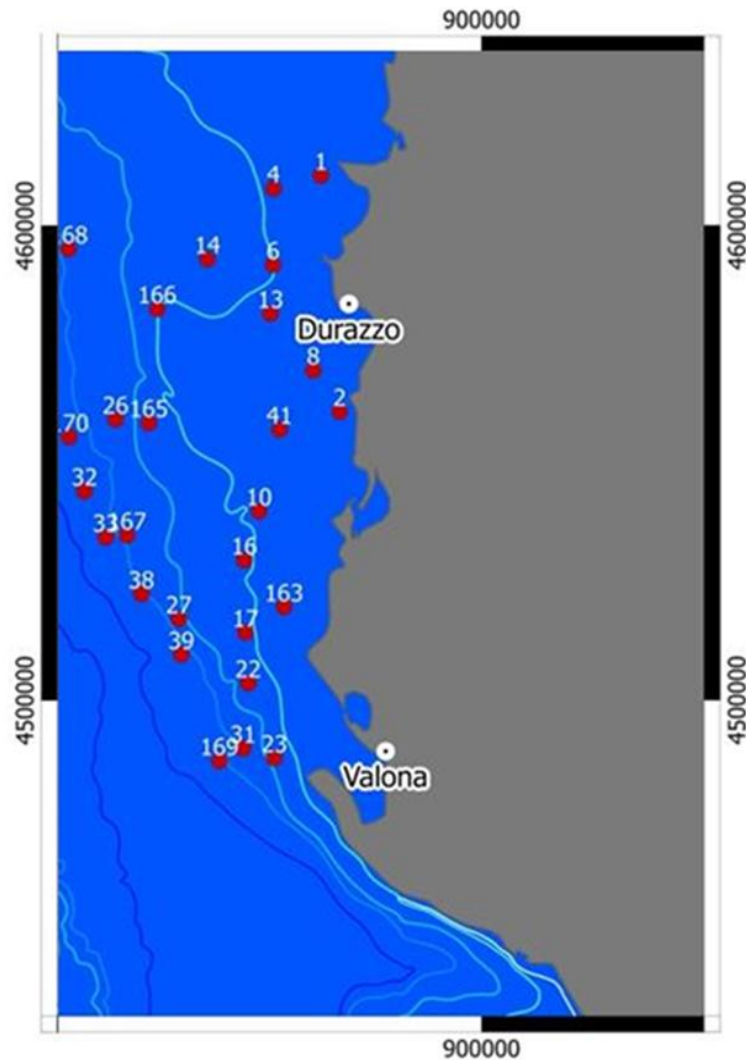




# Marine litter in Medits survey



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MEDITS survey along the Albanian coasts. June, 2015

The survey (27 hauls) taken with staff of Marine Laboratory of Bari ( Italia) and the staff of the Laboratory of Fisheries and Aquaculture of Agriculture University of Tirana. Hauls performed within 3 nautical miles from the coasts and 50 – 800m depth.





# Macroplastic, depth 14-800m



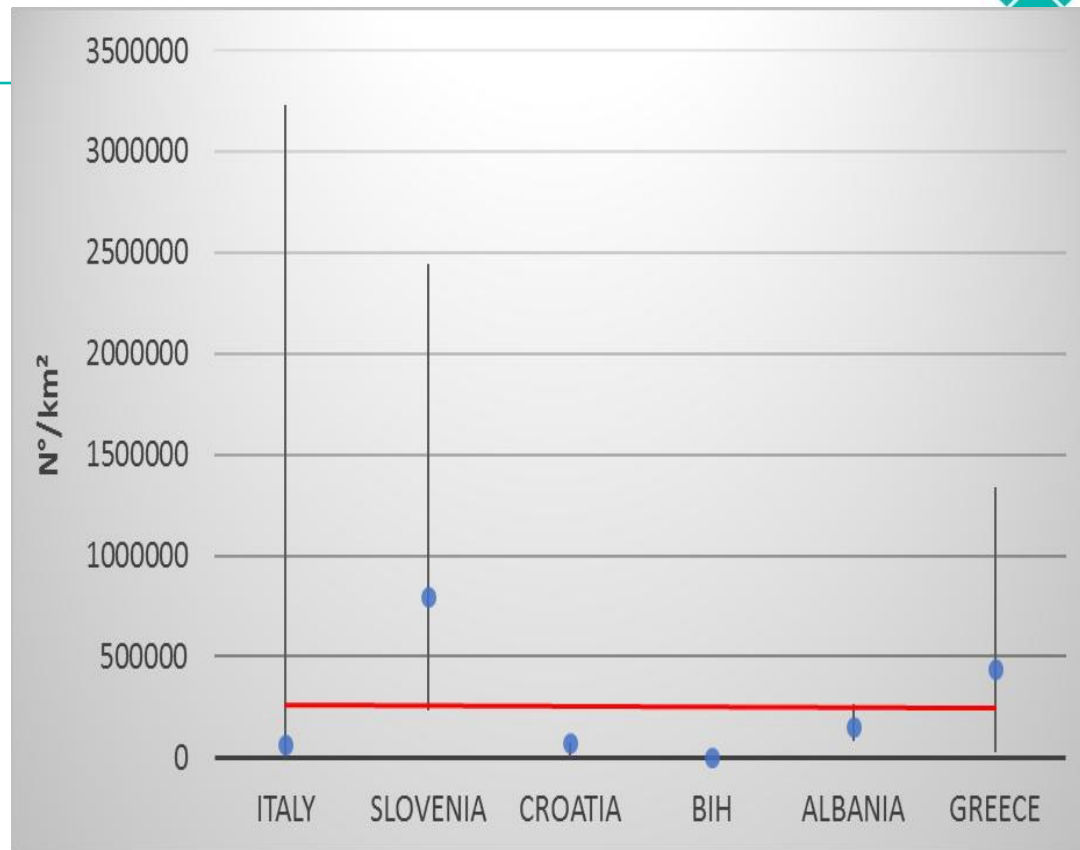
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# Microplastics on the sea surface



Microplastics concentrations on the sea surface are in average **≈250.000 particles/km<sup>2</sup>**

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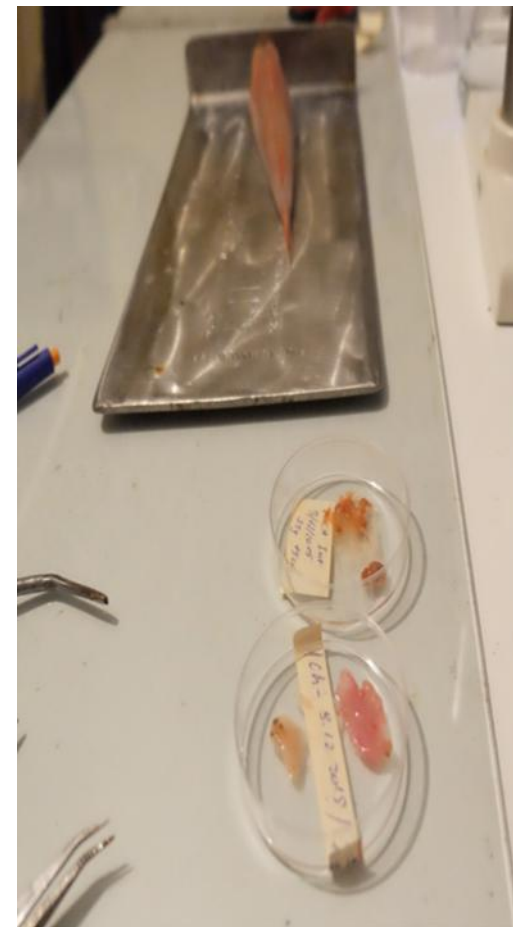
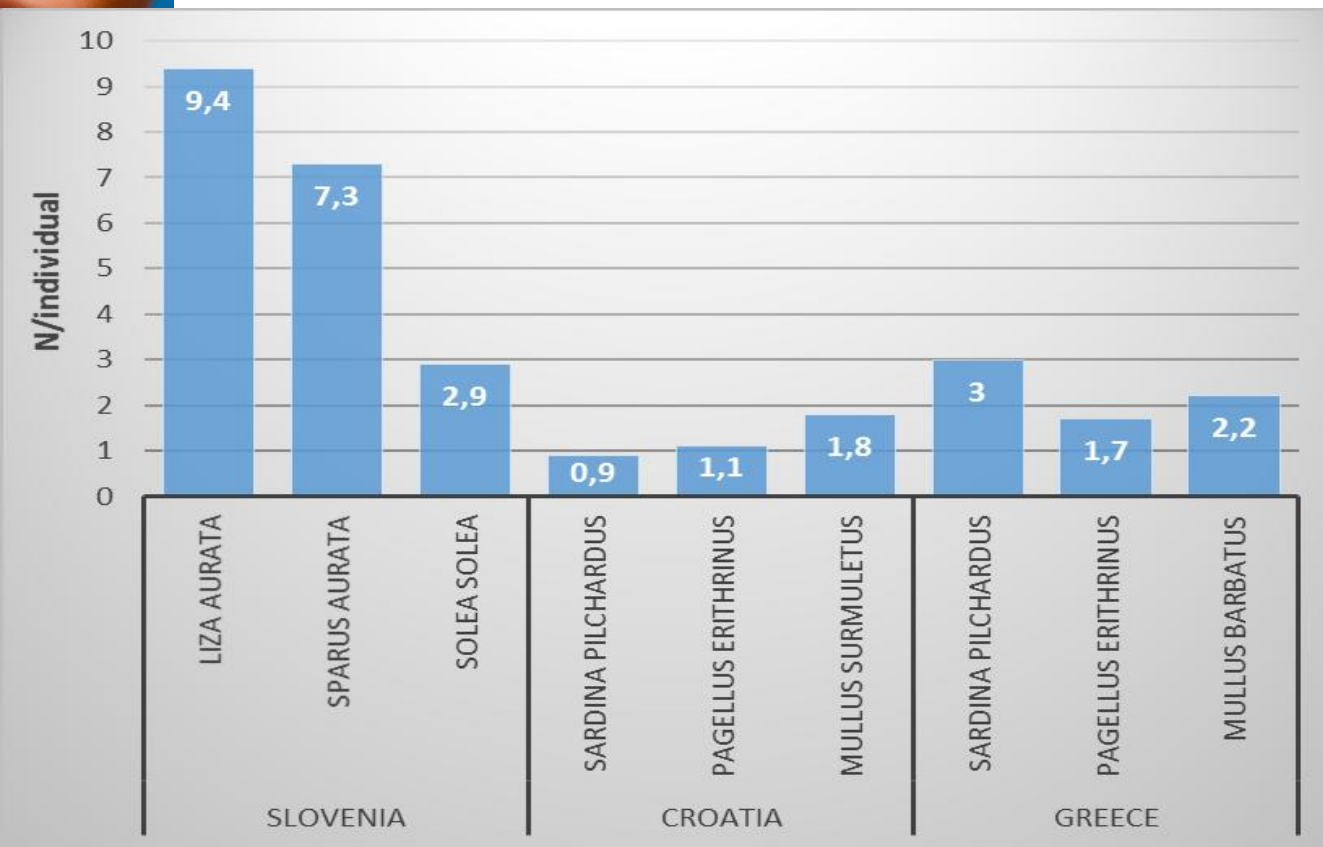


# Microplastics in biota



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Microplastics concentrations in commercially available fishes are in average **3 particles per fish** and in commercially available mussels **2 particles per mussel**

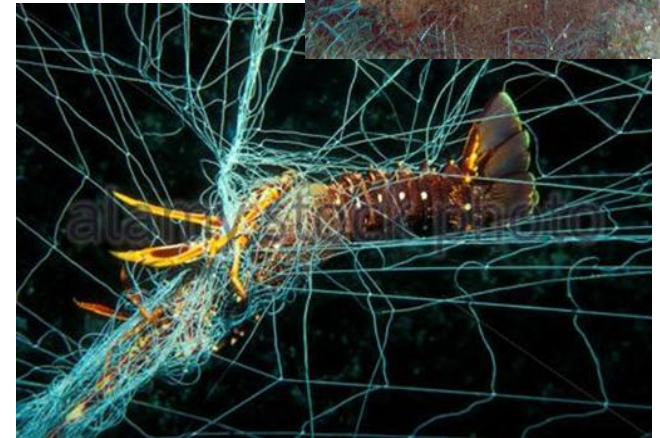




# Ghost net fishing in marine waters

## DFG experience

Gillnets, trammel-nets, trawl-nets, traps and small purse seine nets were found,  
More than 40 different ghost nets have been observed during collected the DeFishGear Project  
Lost fishing gear continue to trap fish 'unintentionally' also of particularly endangered and protected species



# Microplastics studies



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Previous studies report the **ubiquitous presence** of microplastics in the marine environment from the sea to the bottom sediments

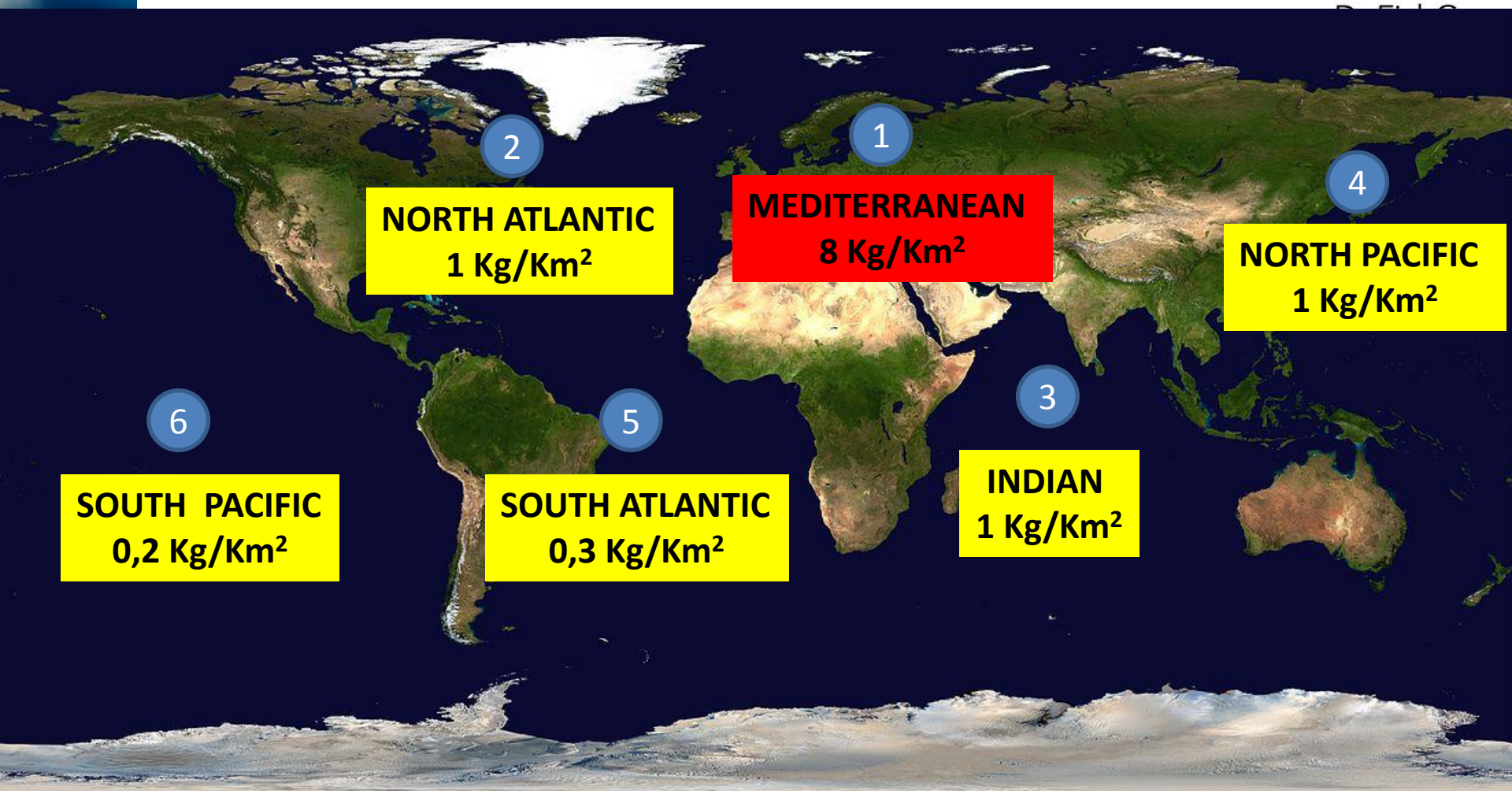
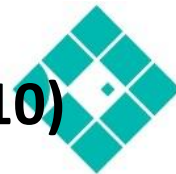
Sea surface	Particles/km <sup>2</sup>	Beach sediments	Particles/m <sup>2</sup>
Pacific Ocean (Yamashita and Tanimura, 2007)	> 174,000 (Japan, Kuroshio current system)	Pacific Ocean (Kuriyama, 2002; Hidfalgo-Ruz and Thiel, 2013)	>1,000 pellets (Japan) 805 fragments and pellets (Easter Island)
Atlantic Ocean (Law et al., 2010)	> 580,000 (Caribbean Sea, North Atlantic)	Atlantic Ocean (Wilber, 1987)	2,000 – 10,000 (Bermuda)
NW Mediterranean Sea (Collignon et al., 2012)	mean: 115,000 – 1,050,000 max. 4,860,000	Indian Ocean (Khordagui and Abu-Hilal, 1994)	> 50 – 80,000 (Arabian Gulf)
Adriatic Sea (DeFishGear, 2013-2016)	225 – 3,234,330	Mediterranean Sea (Turner and Holmes, 2011; Cole et al., 2011) Van Cauwenberghe et al., 2013b)	0.7 – 175 (Malta); max. 1000 pellets 40 (Nile deep sea fan)
		Adriatic Sea (DeFishGear, 2013-2016)	<b>SMP: 1100</b> (70 – 6724) all categories <b>LMP: 110</b> (16 – 500) all categories

Only the data gathered with the same equipment as used in the DeFishGear project are cited.





# Oceans ranked by estimated plastics' concentration (2010)



Adapted from "Plastic pollution in the world's oceans" (2014. Eriksen, Lebreton, et al.)



Regional Activity Centre  
for Sustainable Consumption  
and Production



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# Elsevier, Marine Pollution Bulletin ( march 2018)

## Marine litter on the beaches of the Adriatic and Ionian Seas: An assessment of their abundance, composition and sources

Thomais Vlachogianni<sup>a,\*</sup>, Tomaso Fortibuoni<sup>b</sup>, Francesca Ronchi<sup>b</sup>, Christina Zeri<sup>c</sup>, Aikaterini Anastasopoulou<sup>c</sup>, Cristina Mazziotti<sup>d</sup>, Pero Tutman<sup>e</sup>, Dubravka Bojanić Varezić<sup>e</sup>, Andreja Palatinus<sup>f</sup>, Štefan Trdan<sup>f</sup>, Monika Peterlin<sup>f</sup>, Milica Mandić<sup>g</sup>, Mosor Prvan<sup>h</sup>, **Jerina Kolutari**<sup>i</sup>, Gulielm Kroqi<sup>i</sup>, Vangelis Kalampokis<sup>a</sup>, Michael Scoullou<sup>a</sup>

<sup>a</sup> *Mediterranean Information Office for Environment, Culture and Sustainable Development (MIO-ECSDE)*

<sup>b</sup> *Italian National Institute for Environmental Protection and Research (ISPRA)*

<sup>c</sup> *Hellenic Centre for Marine Research (HCMR)*

<sup>d</sup> *Regional Agency for Environmental Protection in the Emilia-Romagna region (ARPAE)*

<sup>e</sup> *Institute of Oceanography and Fisheries (IOF)*

<sup>f</sup> *Institute for Water of the Republic of Slovenia (IWRS)*

<sup>g</sup> *Institute of Marine Biology (IBM)*

<sup>h</sup> *NGO SUNCE*

<sup>i</sup> *Agricultural University of Tirana (AUT)*



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# Conclusions

## Sea surface

Microplastics concentrations in the Adriatic-Ionian region are higher than the proposed baseline  
**(80.000 – 130.000 items/km<sup>2</sup>)** for the future comparison as defined in document UNEP(DEPI)/MED WG.420/6

## Beach sediments

Microplastic concentrations in the Adriatic-Ionian region in beach sediments are in comparison with other published data from all over the world **in the middle**

## Biota

Microplastics concentrations in biota are in line with other studies from other parts of the world



