MEDAC – Mediterranean Advisory Council
WG5 Socioeconomic Impact
15 April 2021

ISPRA
Istituto Superiore per la Protezione e la Ricerca Ambientale

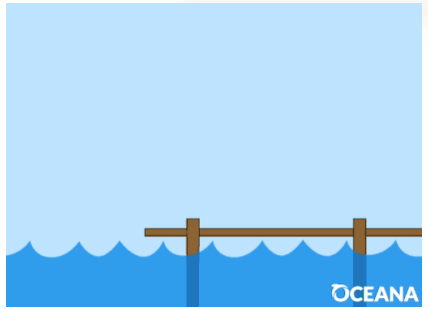
Sistema Nazionale per la Protezione dell'Ambiente

Impact of plastics and marine litter on marine resources and socioeconomic impact on the fishery sector

Tomaso Fortibuoni

“**Any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment**. Marine litter consists of items that have been made or used by people and deliberately discarded into the sea or rivers or on beaches; brought indirectly to the sea with rivers, sewage, storm water or winds; accidentally lost, including material lost at sea in bad weather (fishing gear, cargo); or deliberately left by people on beaches and shores” (UNEP)


80%
OF MARINE
LITTER
IS MADE OF
PLASTIC
AND MICRO-PLASTICS
Union for the Mediterranean
Union pour la Méditerranée
الإتحاد من أجل المتوسط



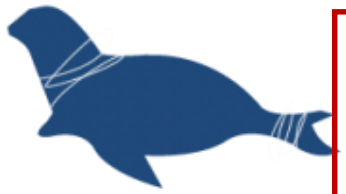
Each year, **8 million tons of plastic end up in the oceans** – the equivalent of a full garbage truck every minute

Plastic stock accumulated in the Mediterranean Sea: 1,178,000 tons
(range 53,500–3,546,700)

IMPACTS OF MARINE DEBRIS

INGESTION

Animals mistakenly eat plastic and other debris.



ENTANGLEMENT & GHOSTFISHING

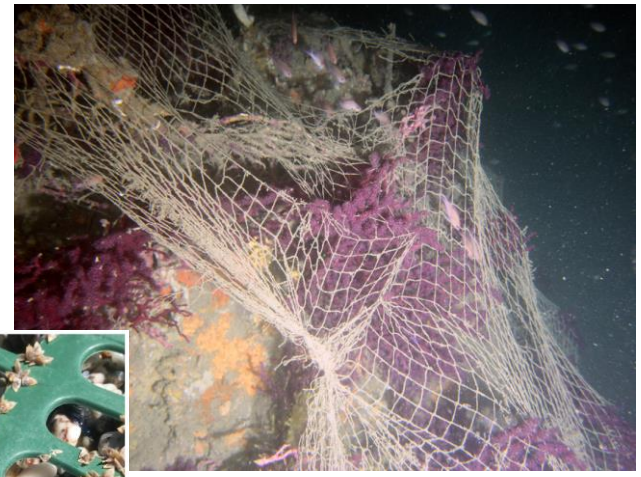
Marine life gets caught and killed in ghost nets, trapped in derelict gear, and entangled in plastic bands and other marine debris.

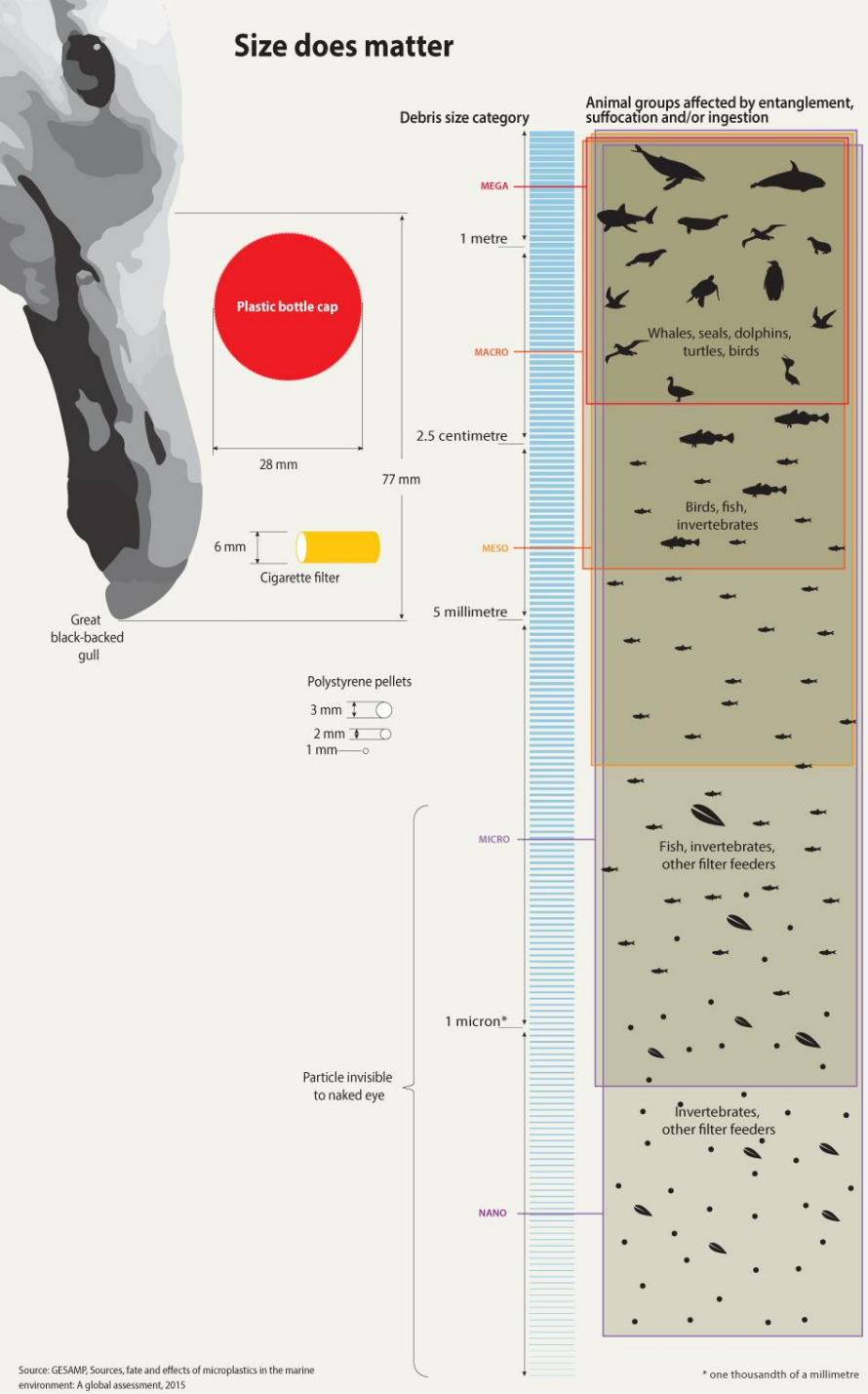
HABITAT DAMAGE

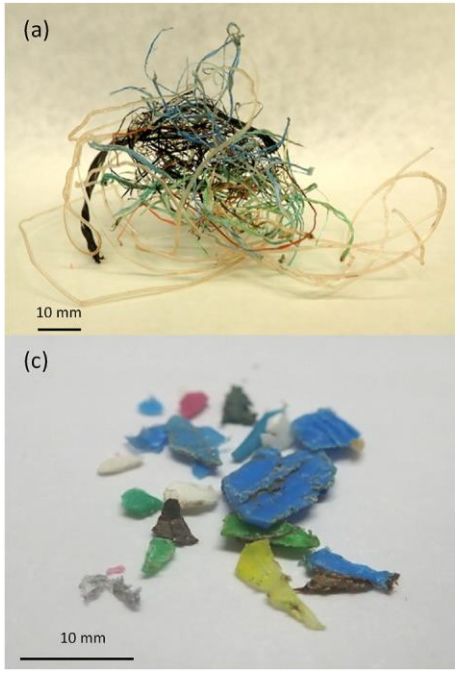
Heavy marine debris crushes sensitive habitat, such as coral reefs and sea grass.

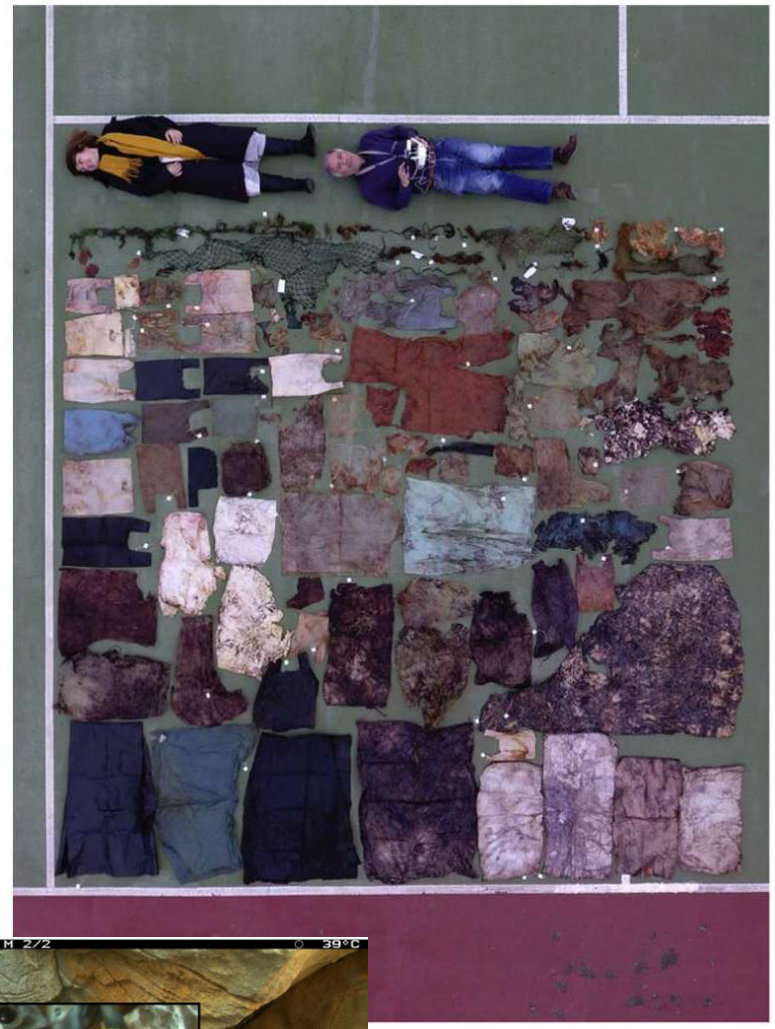
NON-NATIVE SPECIES

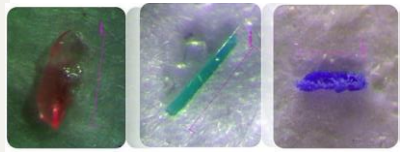
Marine debris transports alien and invasive species from one region to another.

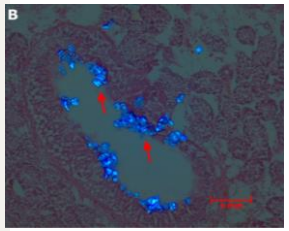



Size does matter
Debris size category
Animal groups affected by entanglement, suffocation and/or ingestion
MEGA
1 metre
MACRO
2.5 centimetre
MESO
5 millimetre
MICRO
1 micron*
NANO
Particle invisible to naked eye
Plastic bottle cap
28 mm
77 mm
6 mm
Cigarette filter
Great black-backed gull
Polystyrene pellets
3 mm
2 mm
1 mm
Whales, seals, dolphins, turtles, birds
Birds, fish, invertebrates
Fish, invertebrates, other filter feeders
Invertebrates, other filter feeders
Source: GESAMP, Sources, fate and effects of microplastics in the marine environment: A global assessment, 2015
* one thousandth of a millimetre


(a)
10 mm
(c)
10 mm






B


2015-09-13 18:42:16 M 2/2 38°C
RONNY STEEN

Plasticized animal species in the Med – INGESTION

Number of species with documented records of marine debris ingestion (116 species in 2019)

10

Seabirds

4

Sea turtles

Marine mammals

6

1

Sea worms

1

Jellyfish

69

Bony fish

Sharks and rays

9

2

Molluscs

12

Crustaceans

2

Echinoderms

Anastasopoulou, A., Fortibuoni, T. (2019). “Impact of Plastic Pollution on Marine Life in the Mediterranean Sea,” in *Handbook of Environmental Chemistry* (Springer Nature), 1–12.

Plasticized animal species in the Med – ENTANGLED

Number of species with documented records of entanglement in marine debris (43 species in 2019)

Crustaceans

2

Marine mammals

3

4

Seabirds

20

Coralli e gorgonie

Sharks and rays

3

2

Sea turtles

5

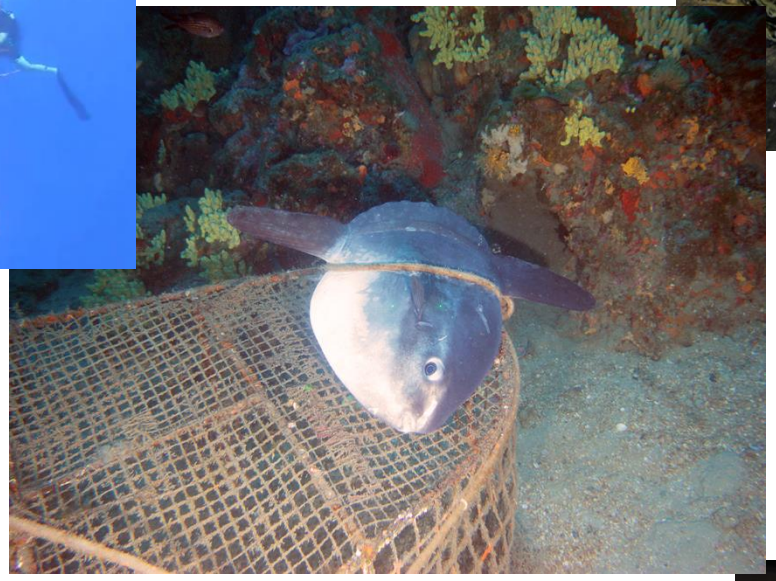
Bony fish

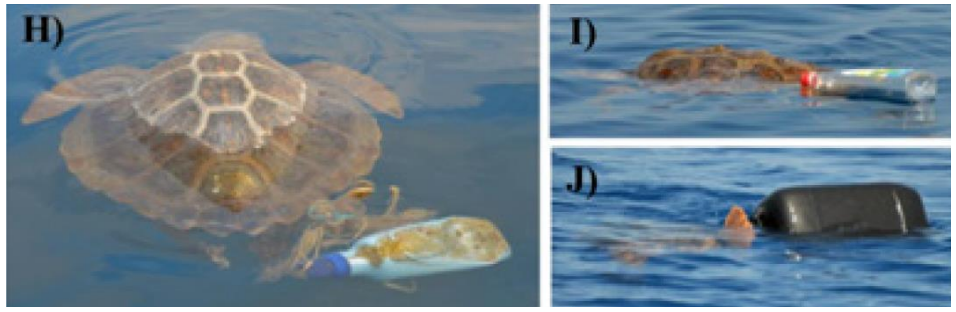
4

Sea sponges

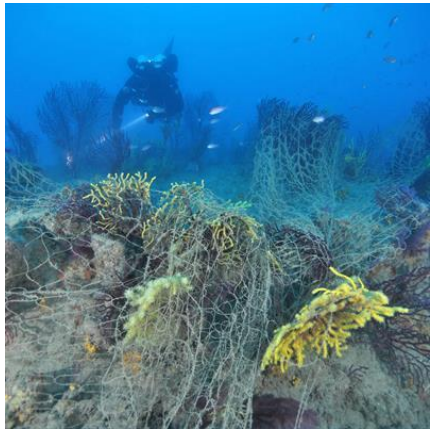
Anastasopoulou, A., Fortibuoni, T. (2019). “Impact of Plastic Pollution on Marine Life in the Mediterranean Sea,” in *Handbook of Environmental Chemistry* (Springer Nature), 1–12.

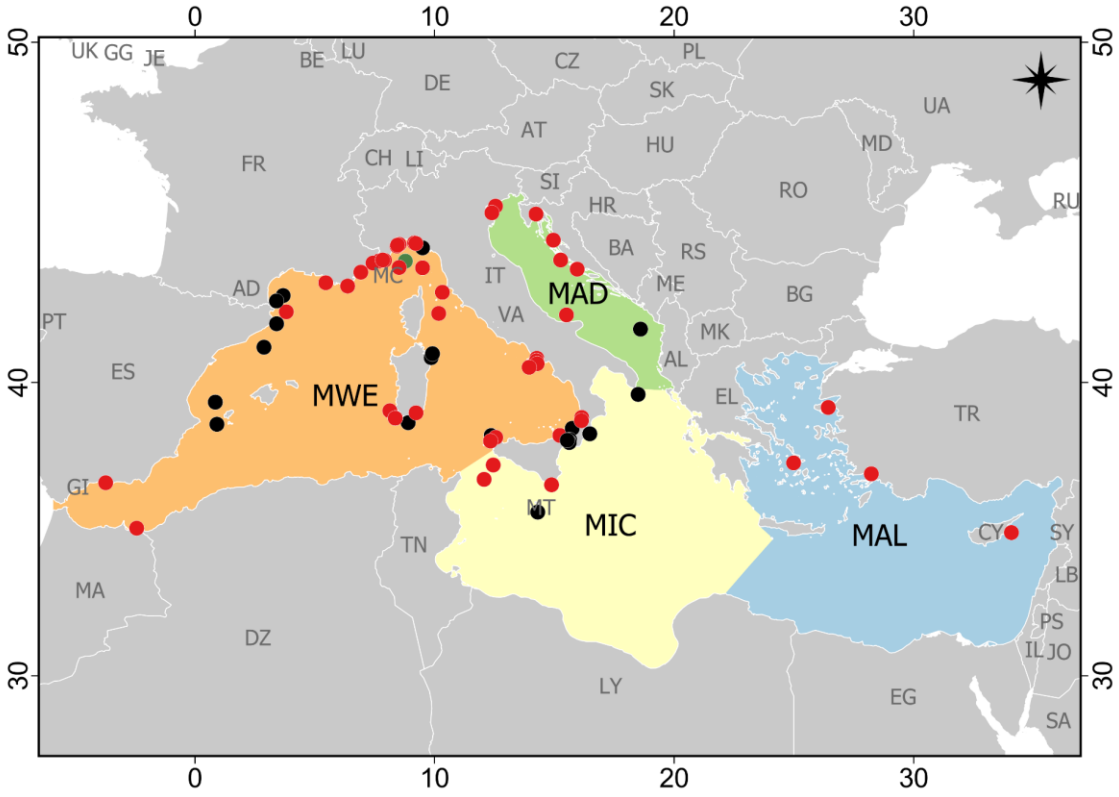
Plasticized animal species in the Med – ENTANGLED



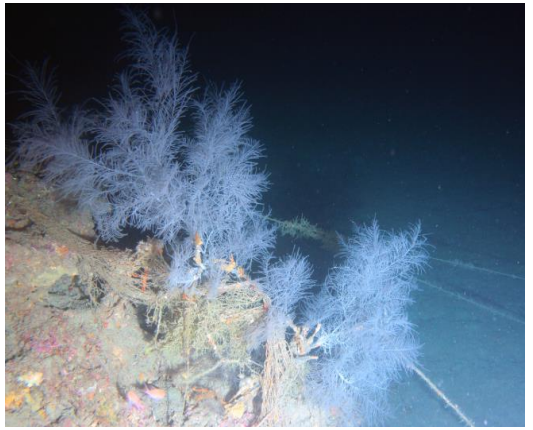


Impacts of marine litter on Mediterranean reef systems: from shallow to deep waters





- 78 reef species impacted
- From shallow waters down to 1.200 m
- The most common impact is the entanglement of corals and gorgonians (including endangered species and sensitive habitats)
- Most of the impacts are due to fishery-related waste and abandoned/lost fishing gears



Angiolillo, M., and Fortibuoni, T. (2020). Impacts of Marine Litter on Mediterranean Reef Systems: From Shallow to Deep Waters. *Frontiers in Marine Science* 7, 1–19

The impact of marine litter on (Mediterranean) marine life is pervasive and widespread

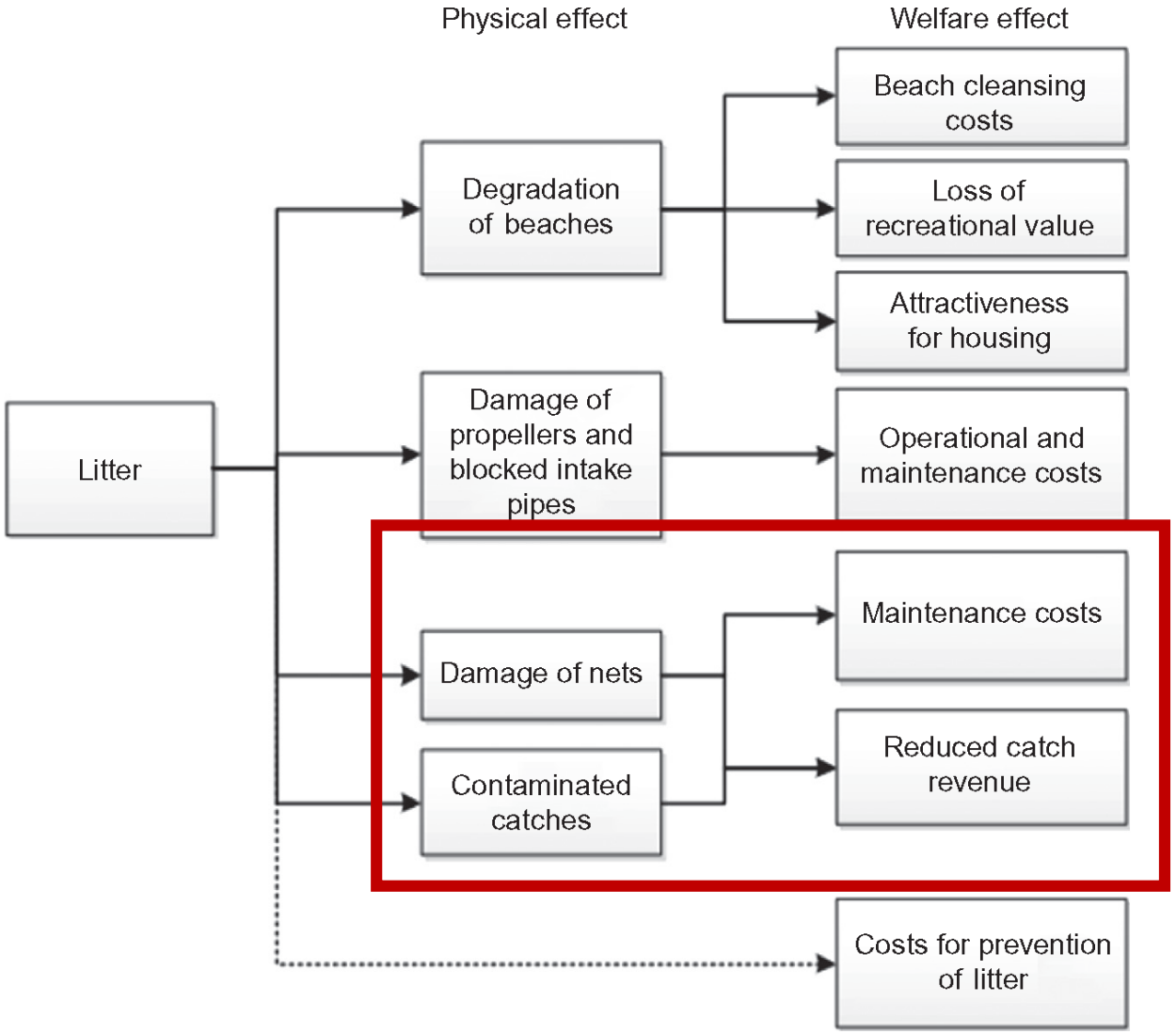
…**ingestion and entanglement can have dramatic consequences on marine life at the individual level**. Conversely, **it is unlikely to occur frequently enough to have adverse demographic impacts in the Mediterranean**, with the possible exception of some marine turtles (Anastasopoulou and Fortibuoni 2019)

The best available evidence suggests that microplastics and nanoplastics do not pose a widespread risk to humans or the environment, except in small pockets. But that evidence is limited, and the situation could change if pollution continues at the current rate (SAPEA 2019)

Anastasopoulou, A., Fortibuoni, T. (2019). "Impact of Plastic Pollution on Marine Life in the Mediterranean Sea," in *Handbook of Environmental Chemistry* (Springer Nature), 1–12.

Science Advice for Policy by European Academies (2019). A Scientific Perspective on Microplastics in Nature and Society. DO - 10.26356/microplastics

Impacts of marine litter on socioeconomic activities



Napper, I. E., & Thompson, R. C. (2019). Marine Plastic Pollution: Other Than Microplastic. In *Waste* (2nd ed., pp. 425–442)

Impacts of marine litter on fisheries

Contamination of fish and shellfish with ingested plastics

Restricted catch due to litter in nets

Lost and damaged fishing gear

Reduced earnings and lost fishing time

Vessel damage and staff downtime

Mouat, J., Lopez Lozano, R., and Bateson, H. 2010. Economic Impacts of Marine Litter. 117 pp.

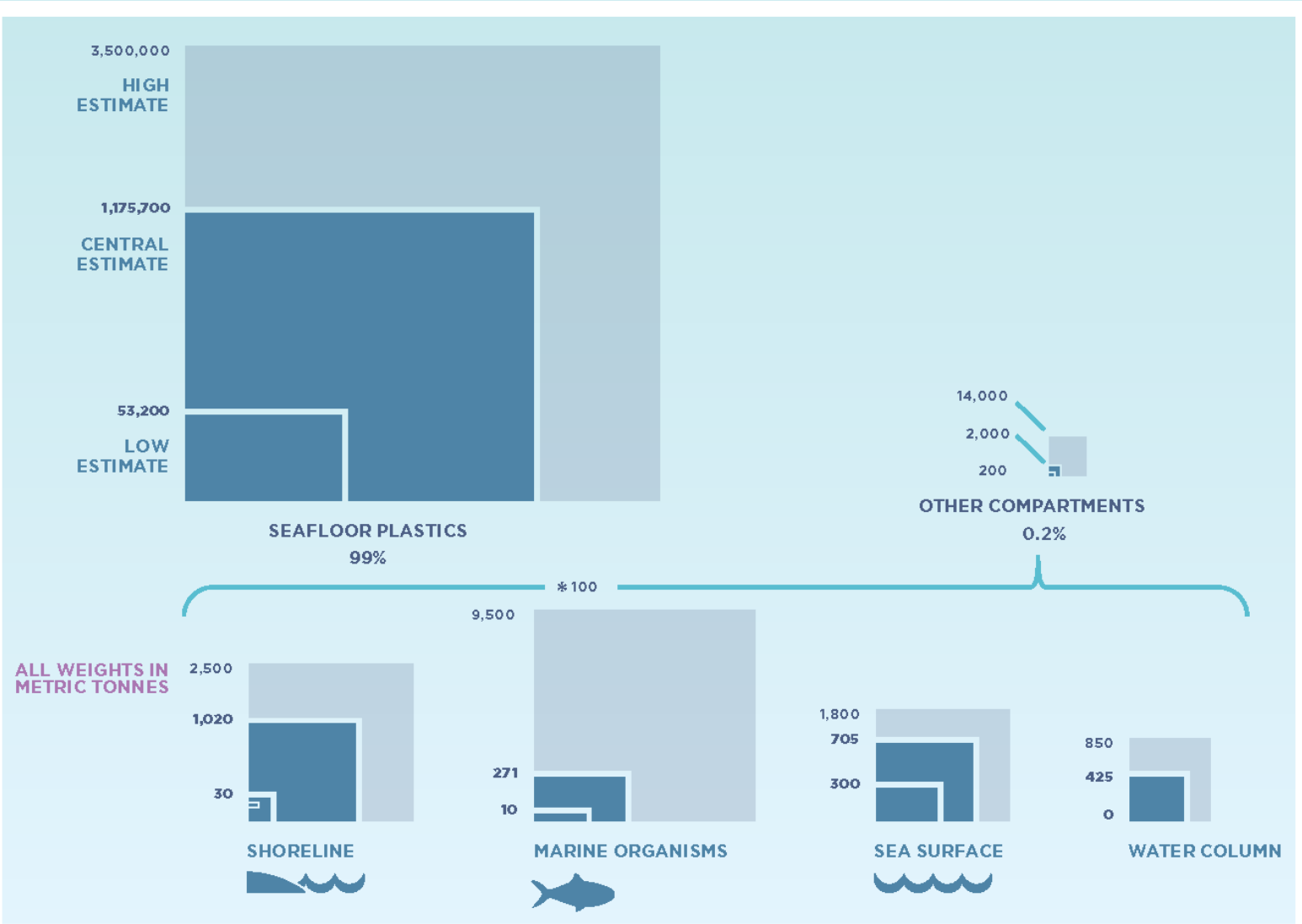


Figure 3.4: Plastic accumulated in the different compartments of the Mediterranean Sea. The three values for each box represent the low/central/high estimates. The central estimate is displayed as a full blue square and labelled with bold font. Values shown in metric tonnes. Seafloor plastic includes both the microplastics trapped in sediments and the mesoplastics and macroplastics deposited on the seafloor.

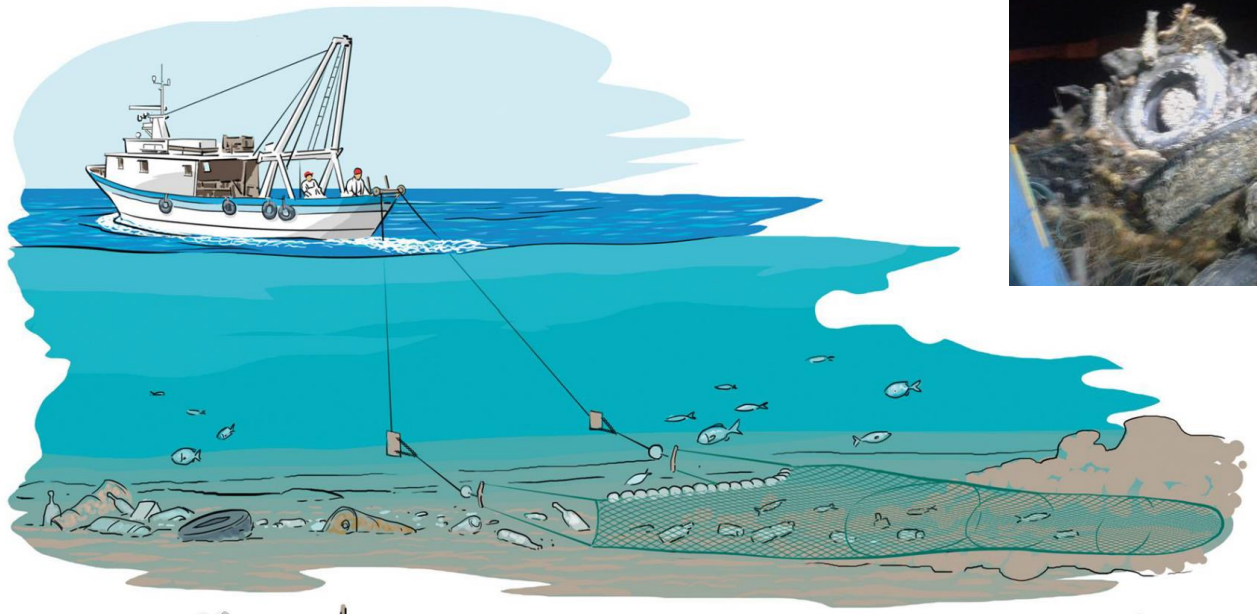
Boucher, J., & Billard, G. (2020). *The Mediterranean: Mare plasticum*. IUCN, International Union for Conservation of Nature

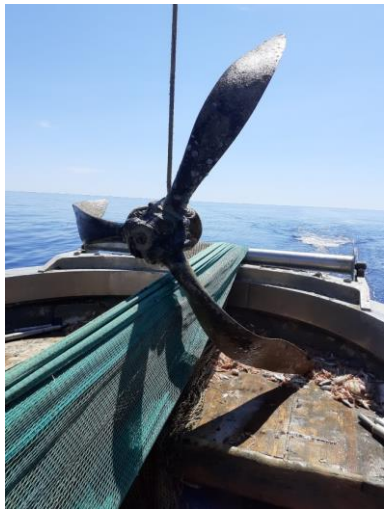
407-1100 m depth, Strait of Messina (year **2019**)

1650 m depth, Ionian Sea (year **2007**)

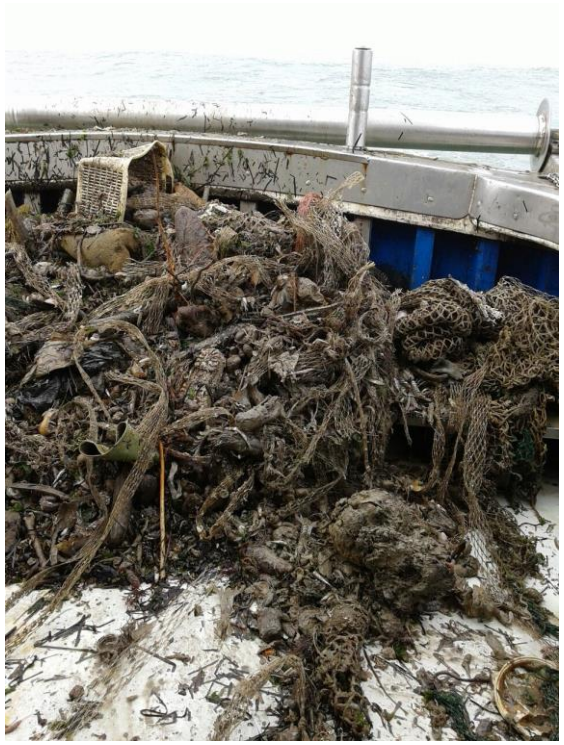
1000 m depth, 20 km offshore Marseille (year **1996**)

20-30 m depth, Adriatic Sea (years **2013-2016**)

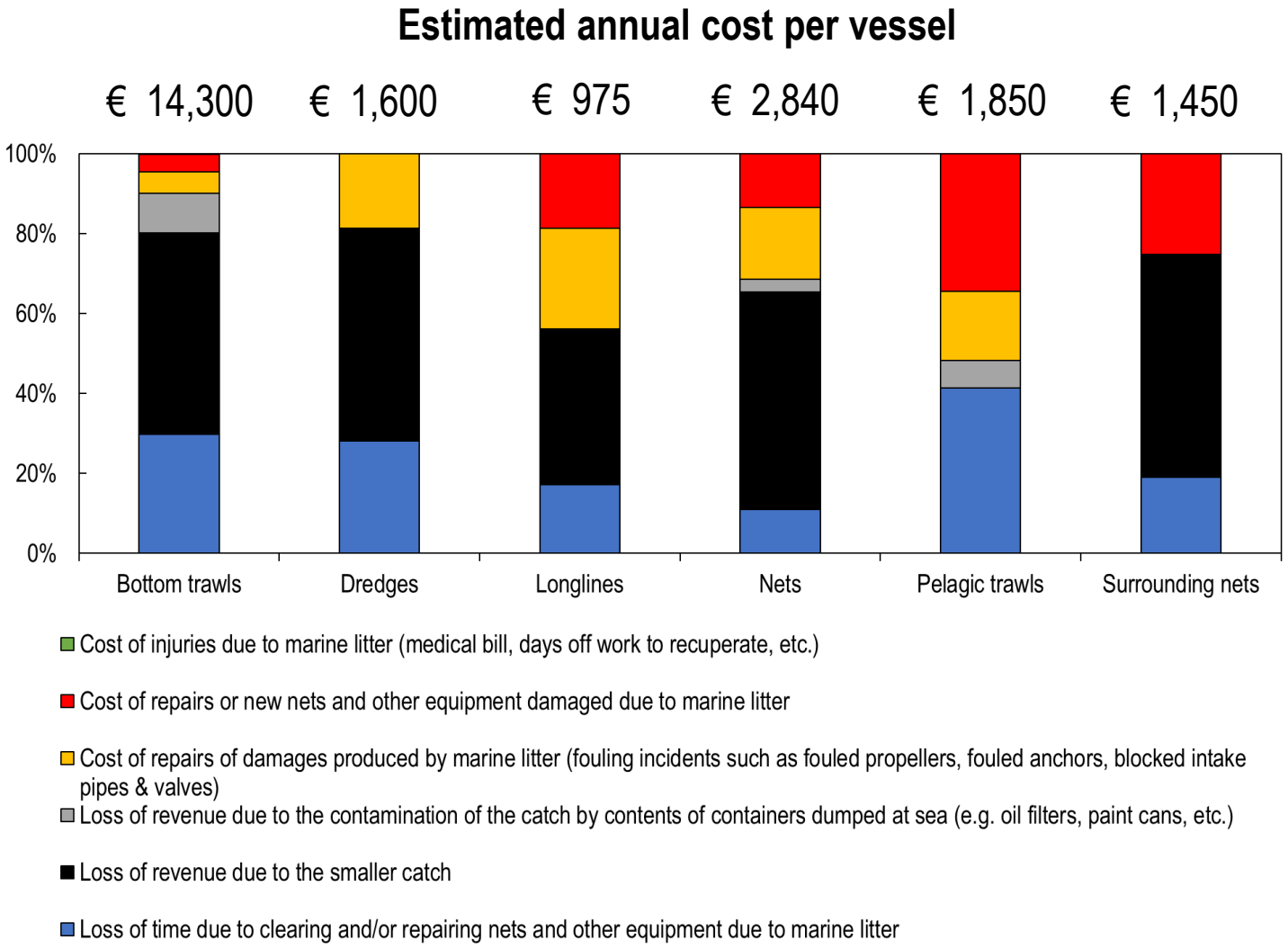





MARINE
LITTER
MARINE
LITTER



Economic impacts of marine litter on Adriatic fisheries

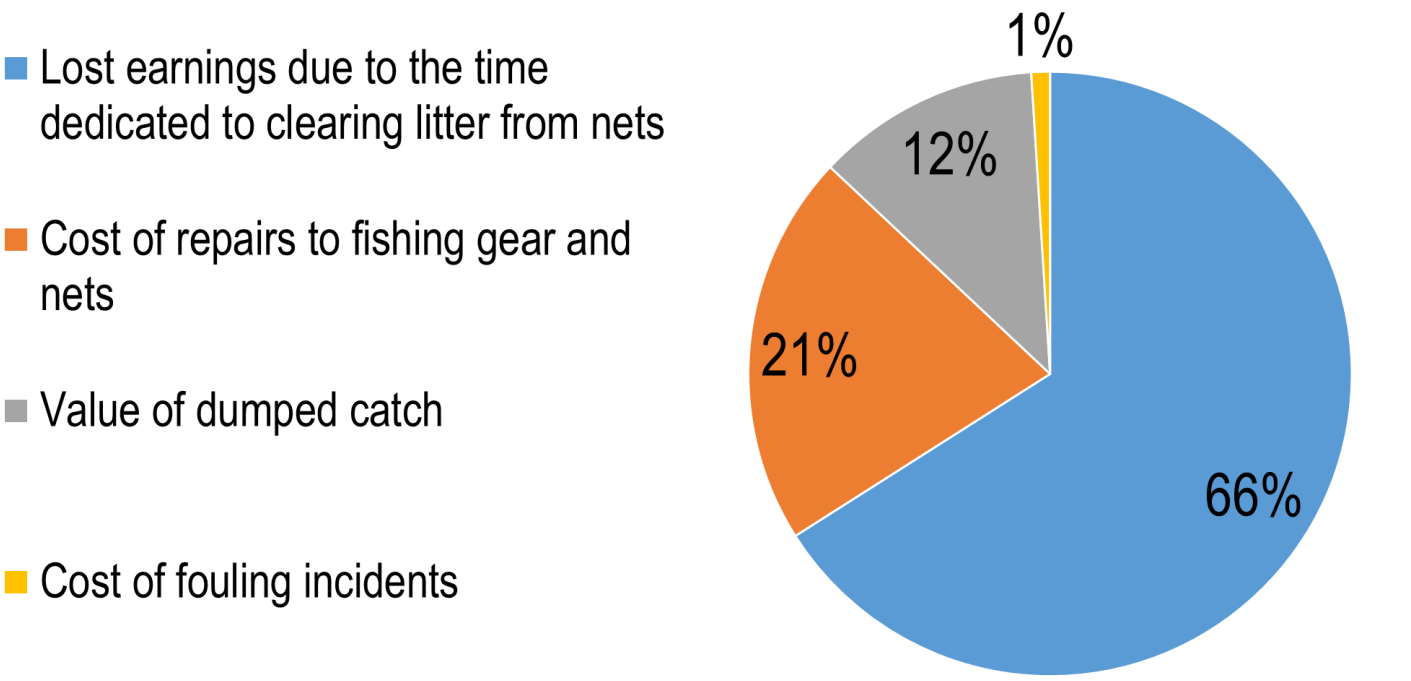


- Survey conducted in 2015
- Countries involved: Italy, Slovenia, Croatia, Montenegro, Albania and Greece
- 213 interviews (fishers, vessel owners, etc.)
- On average, **the annual cost per fishing vessel was estimated to be around € 8,000**
- **All fishing activities suffer the loss of time due to clearing and/or repairing the nets/gears**

DeFishGear
www.defishgear.net

Let's grow up together
Adriatic IPA
Cross Border Cooperation 2007-2013

Economic impacts of marine litter on Scottish fisheries



- Survey conducted in 2007-2008
- **The annual cost per fishing vessel (trawlers) was estimated to vary € 17,000 and € 19,000**
- The loss of fishing time incurred due to clearing nets of marine litter accounts for the majority of costs: on average, each vessel spends 41 hours per year clearing litter from their nets
- On the whole, ghost fishing catches are likely to be low compared to commercial fishing efforts

"Plastics in my net restrict my trawl fishing to its full potential, as the cod-ends fill up with silt quickly. This then alters the geometry of the twin trawl resulting in a poor trawl tow" (Scottish fisher)

KIMO

Mouat, J., Lopez Lozano, R., and Bateson, H. 2010. Economic Impacts of Marine Litter. 117 pp.

Estimated cost of marine litter for the EU fishery sector

	Annual cost per vessel (€)	# vessels in the EU	Total annual cost EU (m€)
Cost of reduced catch revenue (trawlers)	2.340	12 238	28,64
Cost of removing litter from fishing gear (trawlers)	959	12 238	11,74
Cost of broken gear & fouled propellers	191	87 667	16,79
Cost of rescue services	52	87 667	4,54

Total: € 3,542

Total: million € 61.71*

* Equivalent to a reduction of nearly 1% of the total revenue generated by the EU fleet in 2010

ARCADIS. 2014. Final report: Marine Litter study to support the establishment of an initial quantitative headline reduction target - SFRA0025: 315.

Fishing for litter is a simple idea

….that aims to reduce marine litter by involving one of the key stakeholders, **the fishing industry**

Vessels are given bags to collect marine litter that is caught in their nets during their **normal fishing activities**

The crew **separates marine litter from fish**

https://fishingforlitter.org/

Filled bags are deposited in harbours on the quayside where they are moved by harbour staff to a dedicated skip or bin for **free disposal**

Ronchi, F., Galgani, F., Binda, F., Mandić, M., Peterlin, M., Tutman, P., Anastasopoulou, A., & Fortibuoni, T. (2019). Fishing for Litter in the Adriatic-Ionian macroregion (Mediterranean Sea): Strengths, weaknesses, opportunities and threats. *Marine Policy*, *100*, 226–237

Directive (EU) 2019/883 on port reception facilities for the delivery of waste from ships

1) 'Passively fished waste' means waste collected in nets during fishing operations
2) MSs shall ensure the availability of port reception facilities adequate to meet the need of the ships normally using the port without causing undue delay to ships
3) **No direct fee shall be charged for passively fished waste**

Directive (EU) 2019/904 on the reduction of the impact of certain plastic products on the environment

- MSs shall ensure that **extended producer responsibility** schemes are established for fishing gear containing plastic placed on the market
- MSs shall ensure that the **producers of fishing gear containing plastic cover the costs of the separate collection of waste fishing gear** containing plastic that has been delivered to adequate port reception facilities

News from Europe

European Parliament resolution of 25 March 2021 on the impact on fisheries of marine litter (2019/2160(INI))

- Calls on the Commission and the MSs to support the collection at sea by fishers of lost fishing gear or other marine waste.
- Urges MSs to **establish a 'special fund for cleaning the seas'**, managed through the new EMFAF or other relevant budget lines, in order to finance the following actions:
  1) the collection at sea by fishers of marine litter
  2) the provision of adequate on-board waste storage facilities and the monitoring of passively fished litter
  3) improvements in operator training
  4) the financing of the costs of both waste treatment and the personnel required for the operation of such programmes
  5) investments in ports so that appropriate reception and storage facilities can be provided for the lost fishing gear and marine waste collected

Fishers could be part of the solution!

TALES FROM THE FISHERS OF THE
ML-REPAIR
PROJECT

https://youtu.be/jmtB9j8LB4U

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