



# The Plastic Busters MPAs local experiences on monitoring in the National Marine Park of Zakynthos

---

Charis Dimitriadis (NMPZ), Catherine Tsangaris (HCMR)

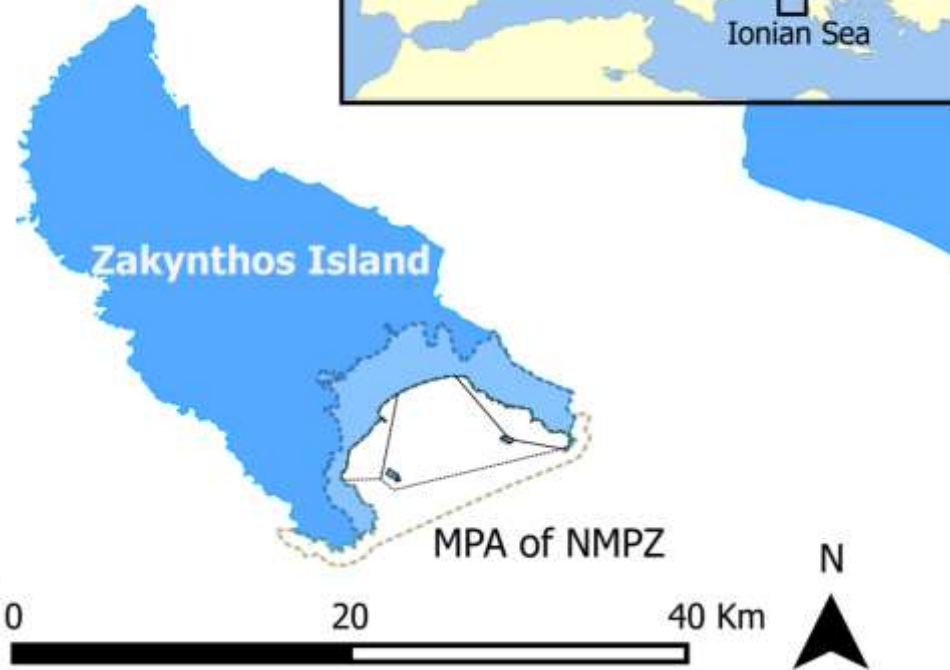
---

CAPITALIZATION EVENT June 17th, 2021, Virtual meeting via MEET



Project co-financed by the European Regional Development Fund

# National Marine Park of Zakynthos



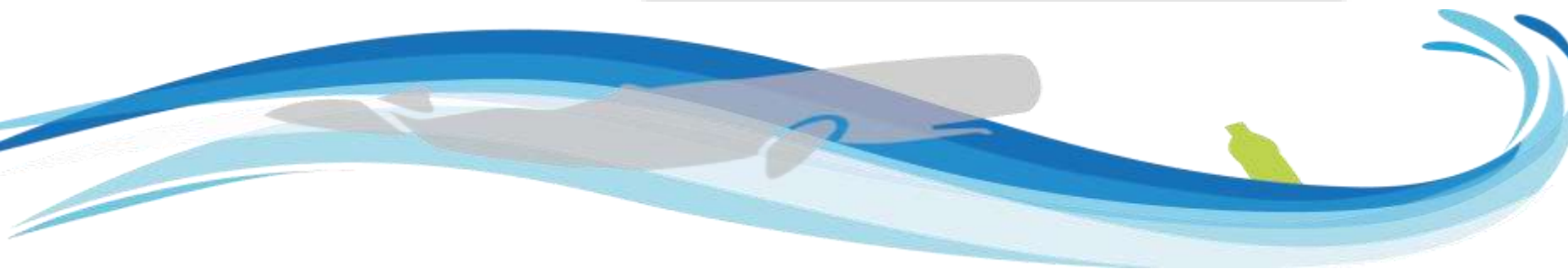
Marine area: 89 km<sup>2</sup> Terrestrial area: 14.2 km<sup>2</sup>

## Facts

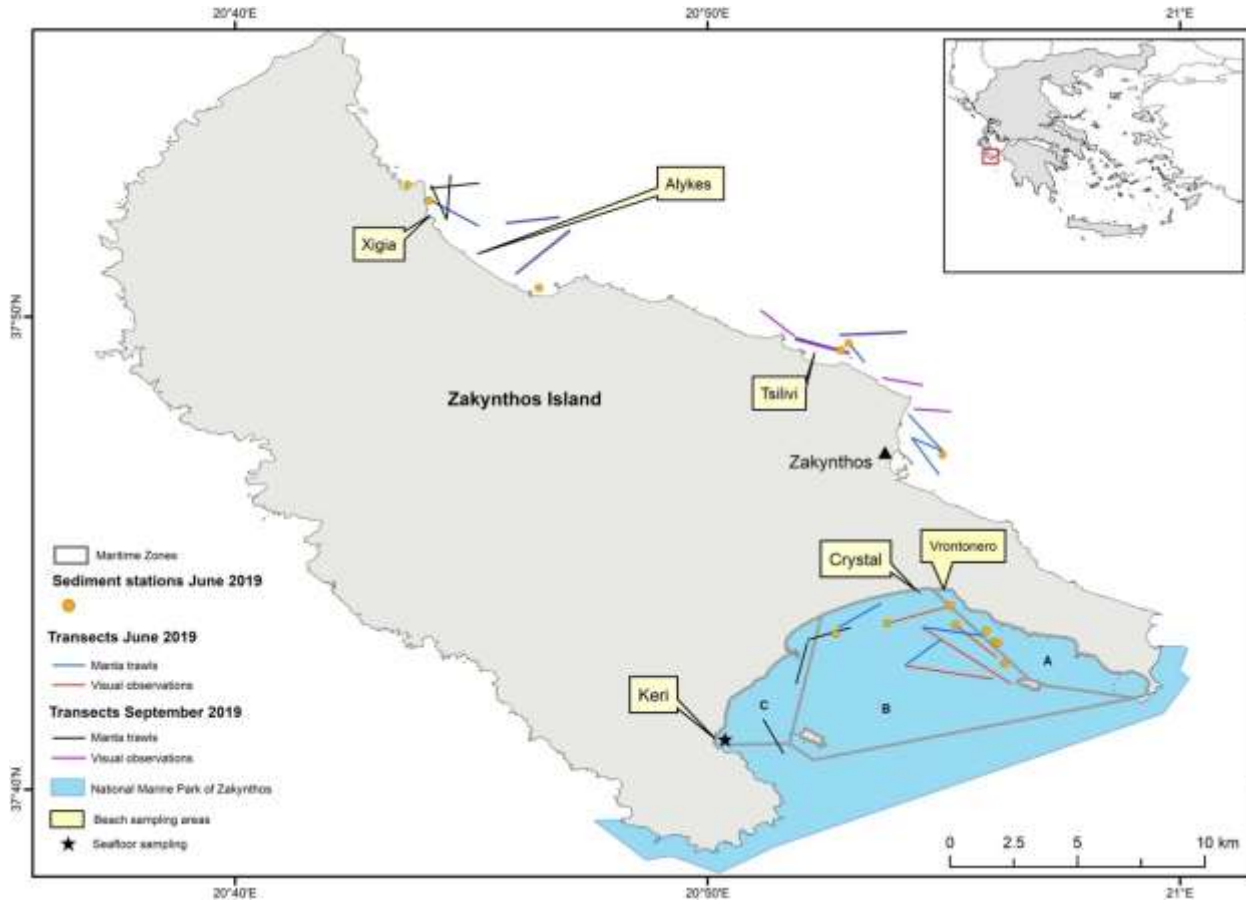
Priority species and habitats  
92/43/EU: sea turtles, monk seal,  
seabirds, cetaceans, Posidonia beds

+15 Endangered or protected  
species / critical habitats for  
reproduction of endangered species  
at Mediterranean level

High recreational and tourism  
pressure



# Implementation of monitoring protocols



- ✓ Beach macro-micro litter
- ✓ Sea surface macro-micro litter
- ✓ Sea floor macro-micro litter
- ✓ Microplastics in selected commercial species
- ✓ Macro-micro plastics in endangered species

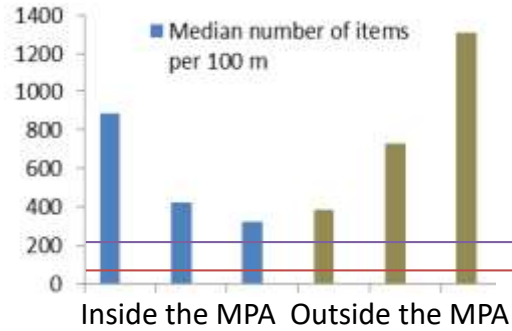




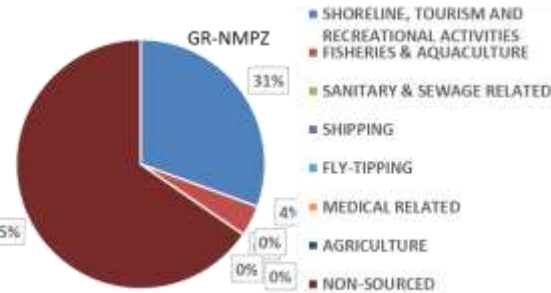
# Implementation of monitoring protocols



## Beach macro-micro litter

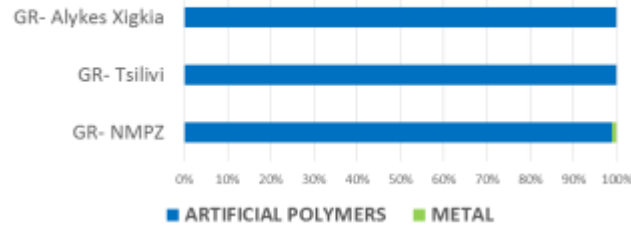


EU baseline value 65  
EU beach litter threshold value 10

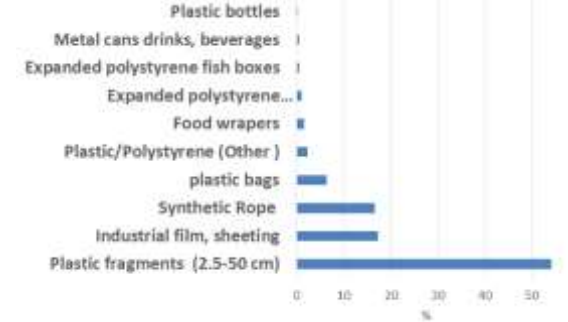
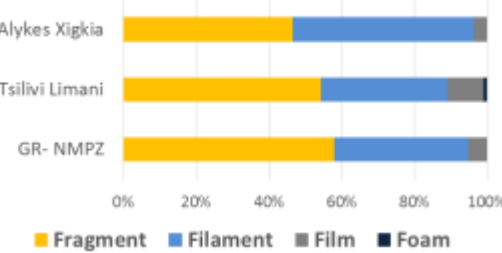


## Sea surface macro-micro litter

### Macro-litter

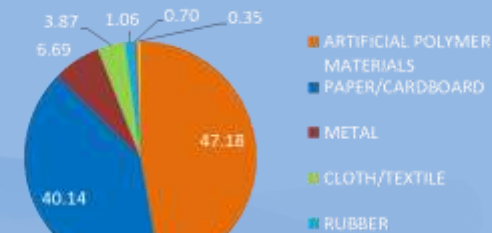


### Micro-litter

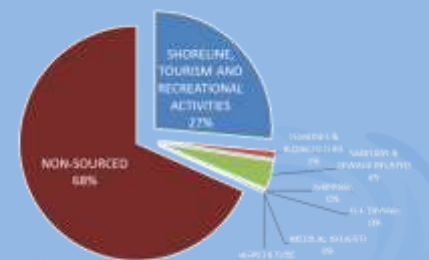


## Sea floor macro-micro litter

### % Seafloor macrolitter composition



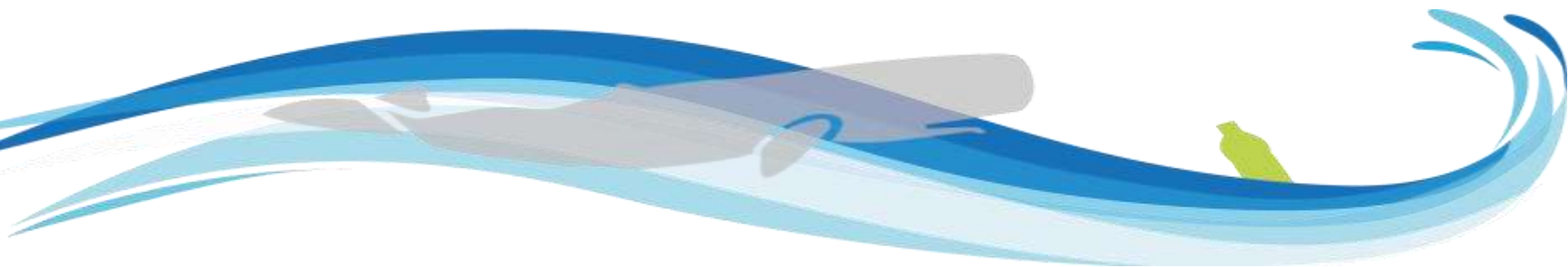
### Where they come from?



Project co-financed by the European Regional Development Fund

# lessons learnt: An MPA manager perspective

	MPA staff involvement in sampling	MPA staff skills needed	Complexity of data analysis for MPA staff	Equipment needed by the MPA	External expertise is needed	Direct transferring to management	Replicability for long term data
Beach macro litter	high	low	low	low	no	high	yes
Beach micro litter	high	low	moderate	high	yes	moderate	conditional
Sea surface macro litter	high	low	low	high	no	high	yes
Sea surface micro litter	high	low	moderate	high	yes	moderate	conditional
Sea floor macro litter	moderate	moderate	low	high	no	high	yes
Sea floor micro litter	moderate	moderate	moderate	high	yes	moderate	conditional



# Implementation of monitoring protocols: increasing complexity/novelty

Microplastics in selected commercial/harvested species

alive



*Mytilus galloprovincialis*



*Paracentrotus lividus*



*Pachygrapsus marmoratus*



*Mullus surmuletus*

dead

36 species (769 individuals ) related to fisheries inside & outside the MPA examined for litter ingestion

Macro-micro plastics in endangered species (megafauna)

Seabirds

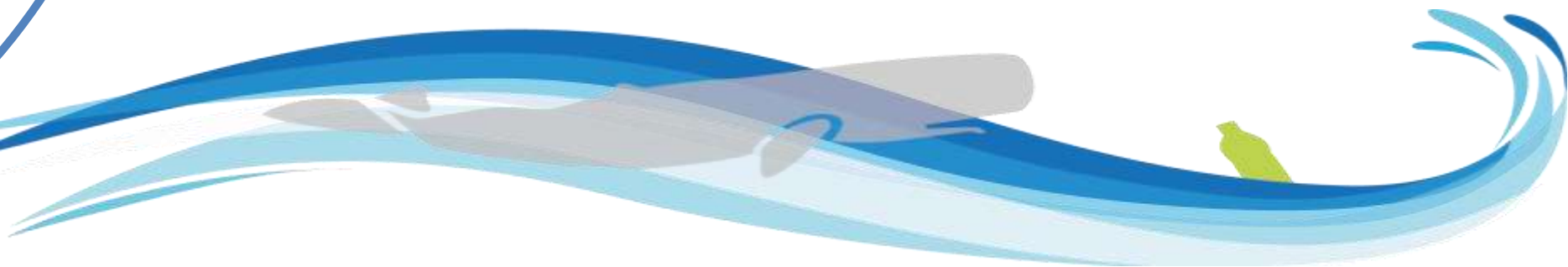
Monk seals

Sea turtles



PLASTIC BUSTERS MPAs

Project co-financed by the European Regional Development Fund





# Implementation of monitoring protocols: increasing complexity/novelty

Microplastics in selected commercial/harvested species



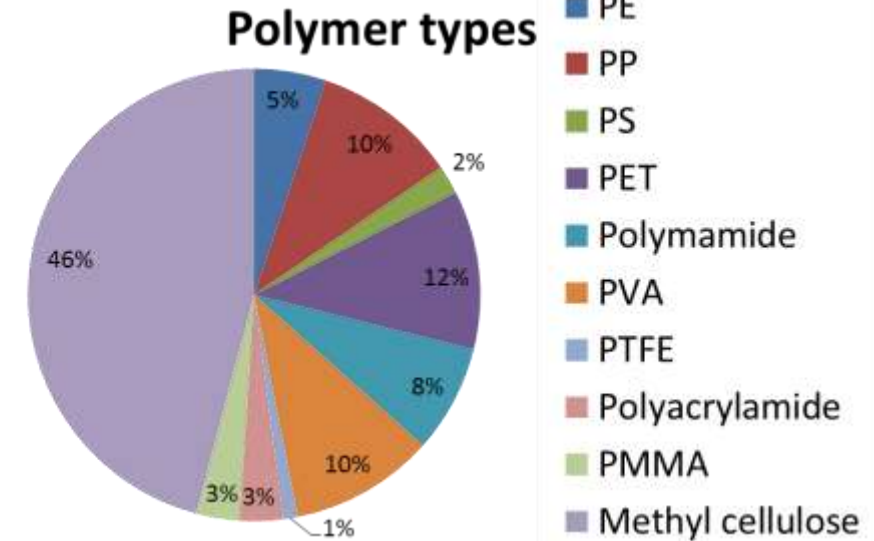
*Mullus surmuletus*

## Microplastic analysis

### Biomarkers analysis:

Genotoxicity (MN test)  
Neurotoxicity (ACHE)  
Oxidative stress (CAT, TBA)  
Biotransformation (GST)  
Biotransformation (EROD)  
Genotoxicity (Comet assay)  
Endocrine disruption (VTG-*M. surmuletus*)

## Plastic tracers analysis



Average  $0.55 \pm 0.75$  MPs/fish



Project co-financed by the European Regional Development Fund

# Implementation of monitoring protocols: increasing complexity/novelty

Macro-micro plastics in endangered species (megafauna)



Samples	Type of particle			Particles identified
	Filament	Fragment	Sphere	
A1	13	3	0	6
A2	22	0	0	16
A3	28	0	0	20
F1	6	1	1	4
F2	12	1	0	7
F3	9	2	0	6
F4	6	18	0	21
M1	6	0	0	2
M2	14	3	0	5
M3*	15	3	0	2
Sw1	15	1	0	6
Sw2	22	6	0	9

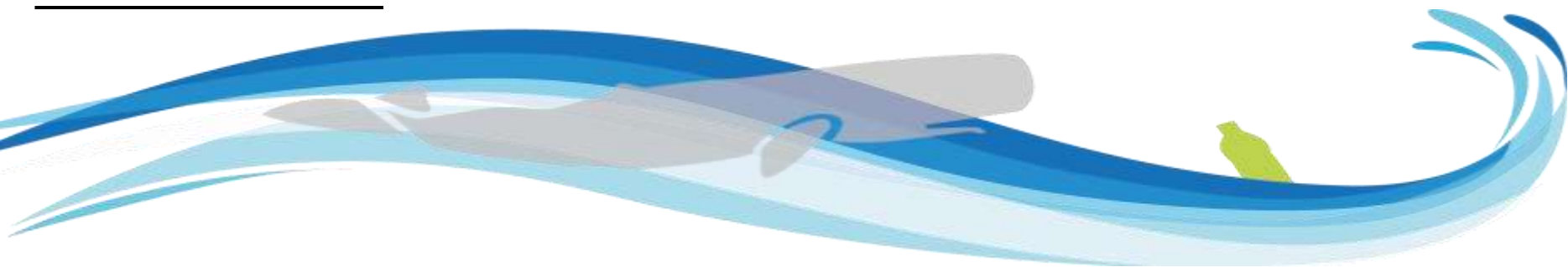


Genotoxicity biomarker:  
Micronuclei test

MN (%):  $0.127 \pm 0.192$



Project co-financed by the European Regional Development Fund





# Lessons learnt as complexity increases

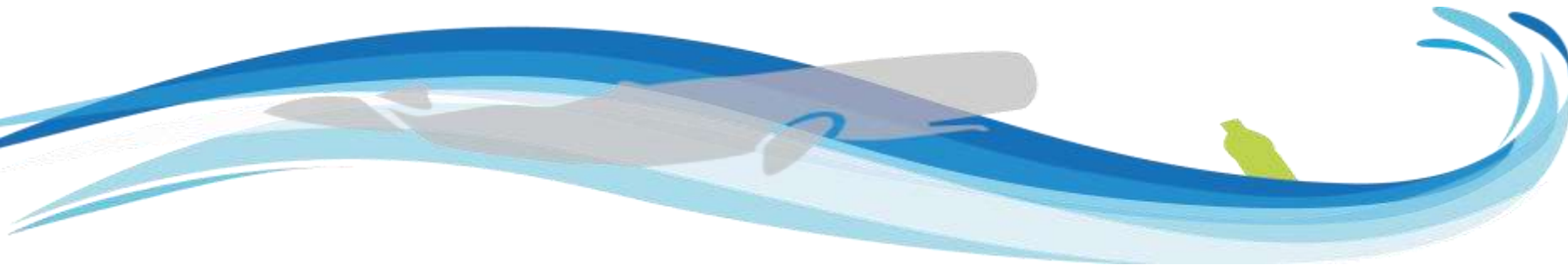
**An overall point of view of an MPA manager**

**Significant knowledge has been gained**

**Carrying capacity increased (know how, man power, equipment use )**

**Outputs can be transferred to management design and mitigation actions**

**Replicability is feasible through the joint efforts of managers and scientists**





**Thank you!**



@PlasticB\_MPs



@PlasticBustersMPAs

[www.plasticbustersmpas.interreg-med.eu](http://www.plasticbustersmpas.interreg-med.eu)



Project co-financed by the European Regional Development Fund