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

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Plastic Busters MPAs Capitalization Event | 12 October 2021

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National Marine Park of Zakynthos

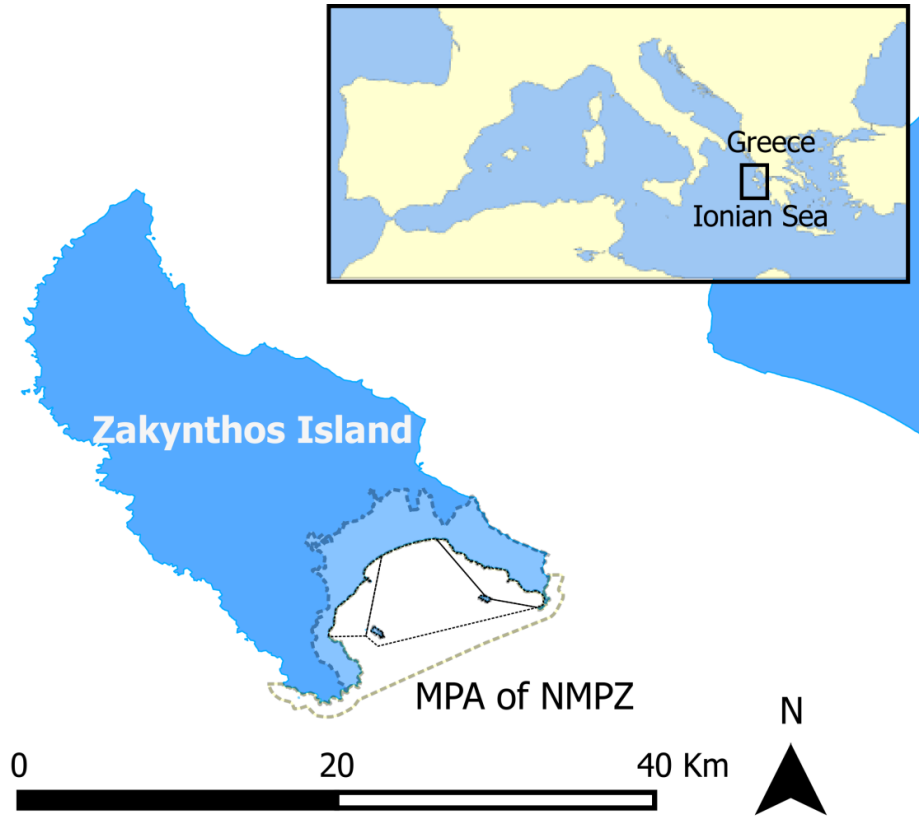
Marine area: 89 km^2 Terrestrial area: 14.2 km^2

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



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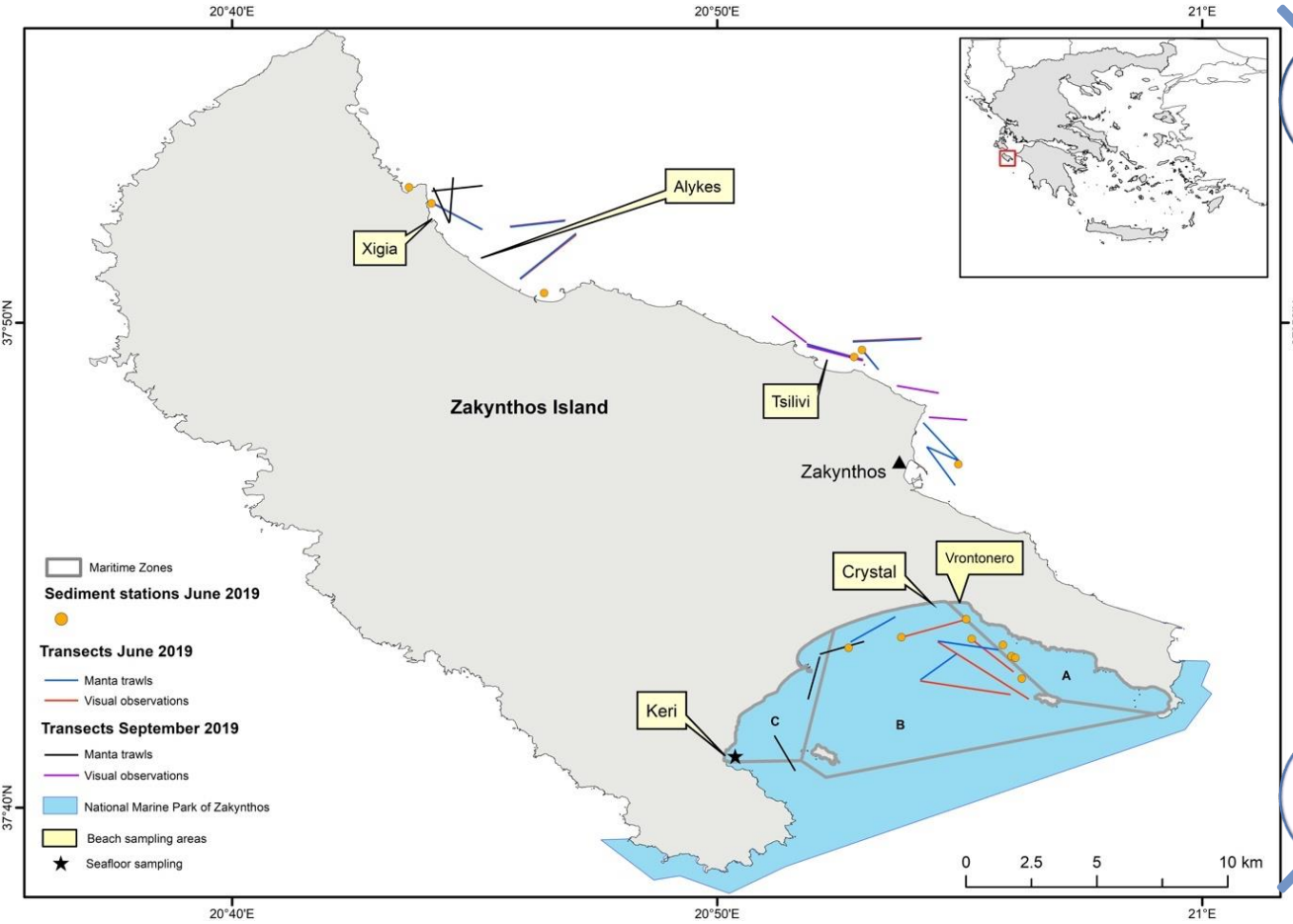
Implementation of monitoring protocols



- Beach macro-micro litter
- Sea surface macro-micro litter
- Sea floor macro-micro litter
- Micro litter in selected commercial species
- Macro-micro litter in endangered species

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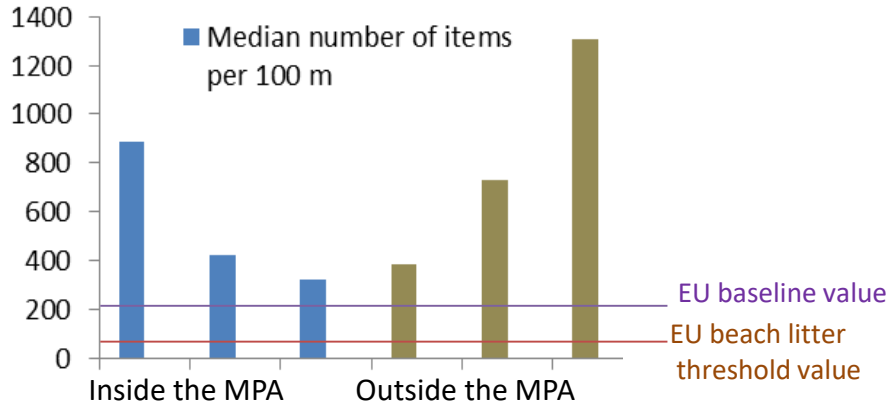
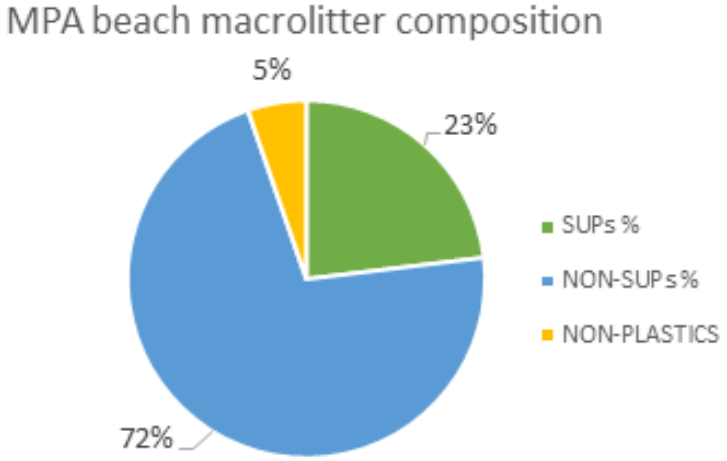
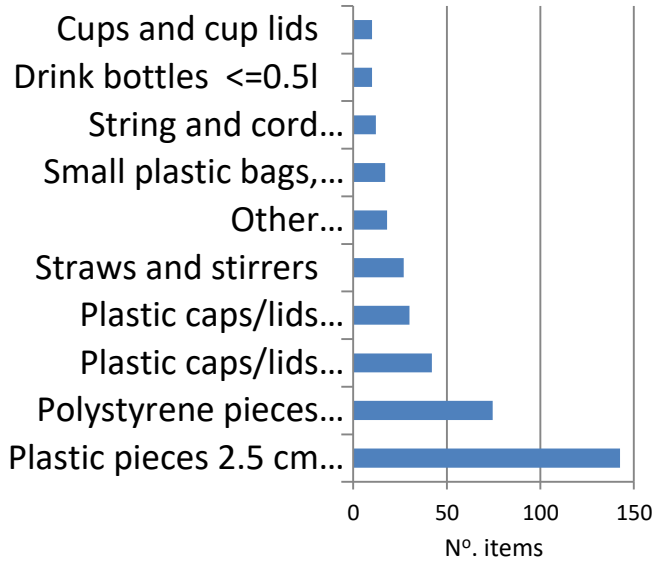
Beach litter

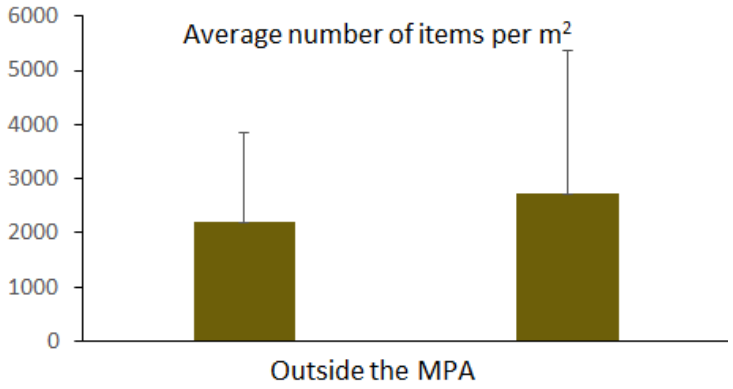
Macro-litter

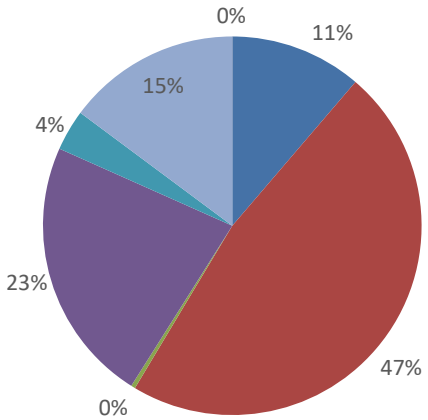


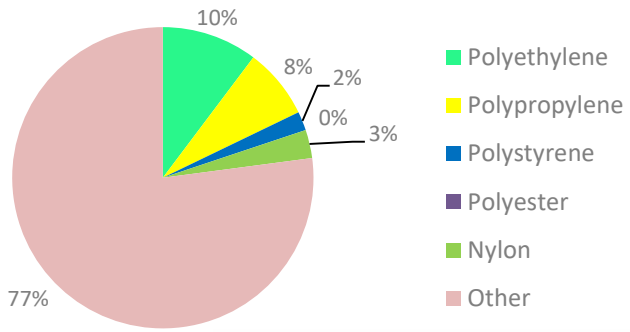




Micro-litter







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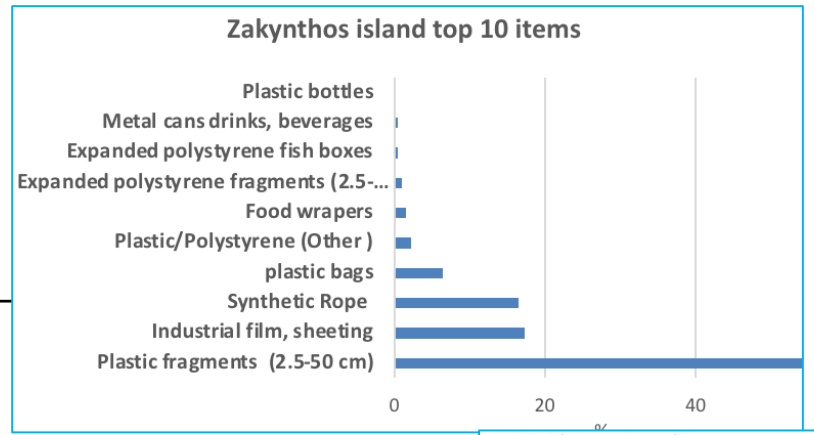
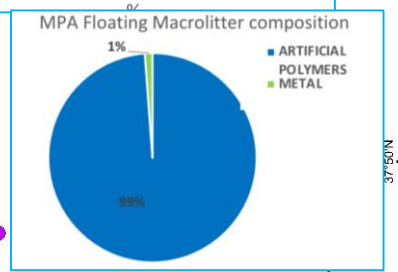
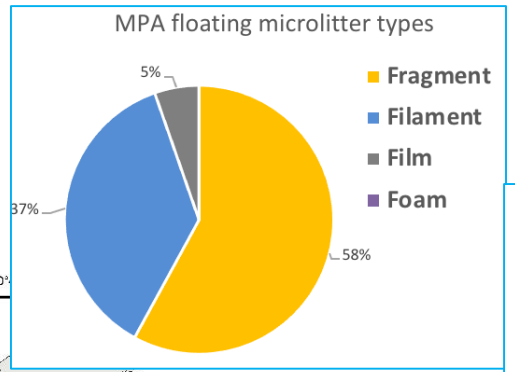
Floating litter

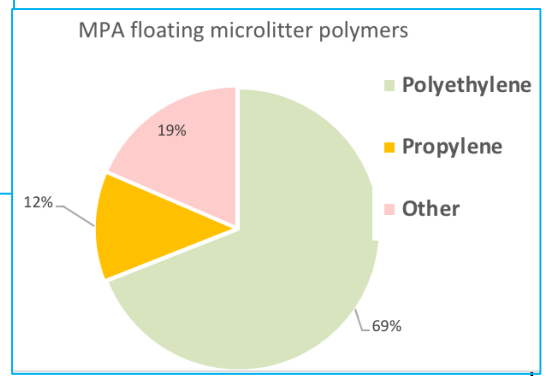
Macro-litter





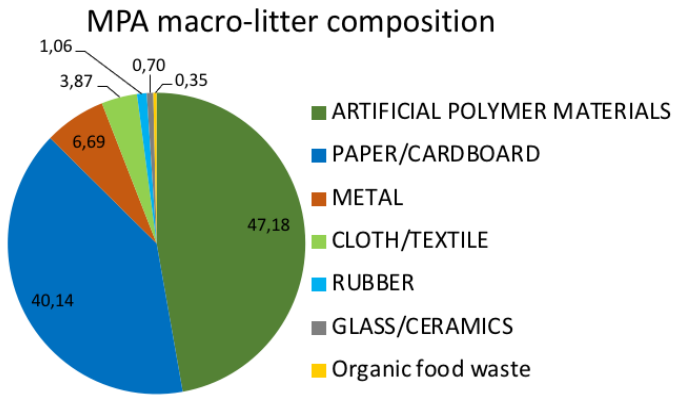
Micro-litter

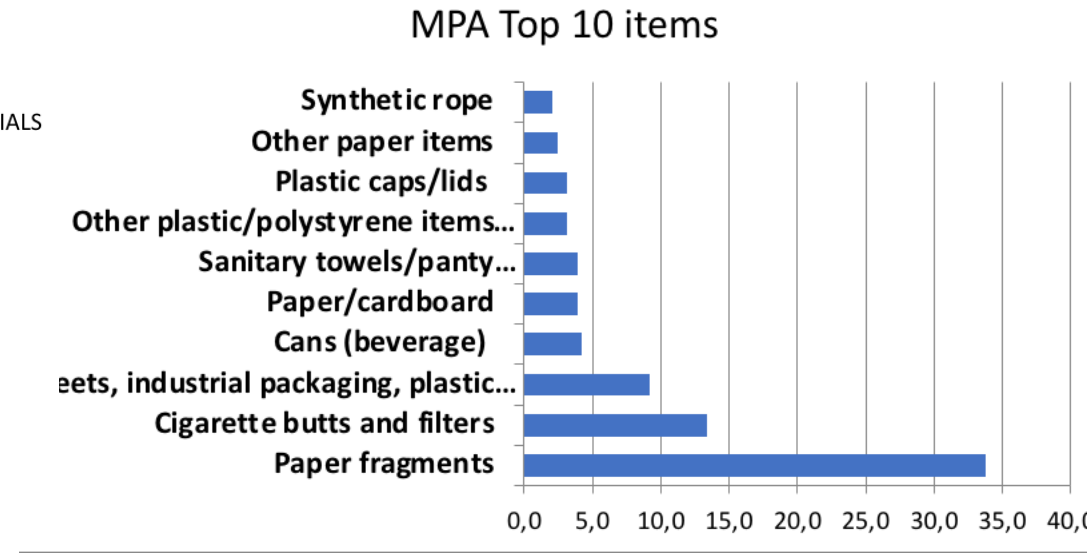




Seafloor litter

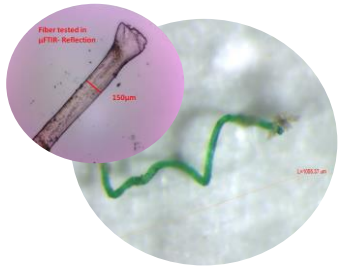
Macro-litter

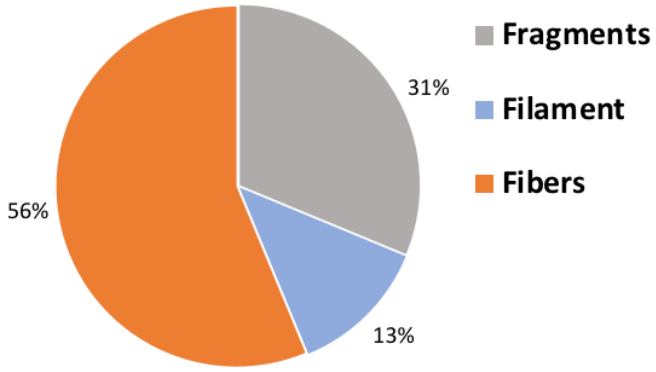


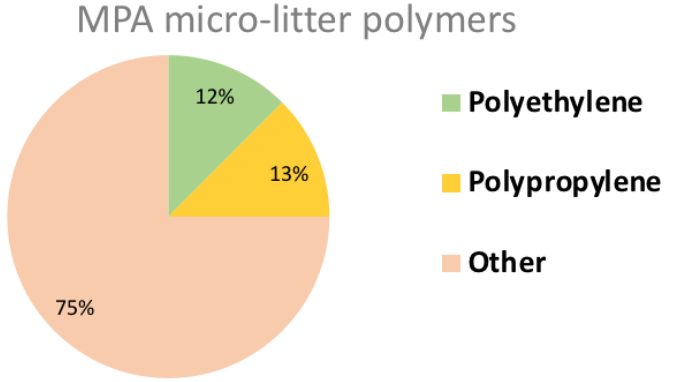


Macro-litter density: 9466.67 items/km^2

Micro-litter







Micro-litter abundance: 1.56 to 78.81 items per kg of dry sediment

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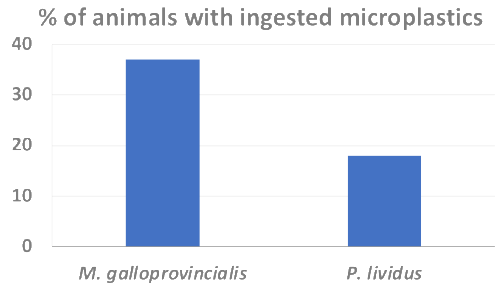
Microplastics and their effects in commercial species

Microplastic ingestion

Plastic additives

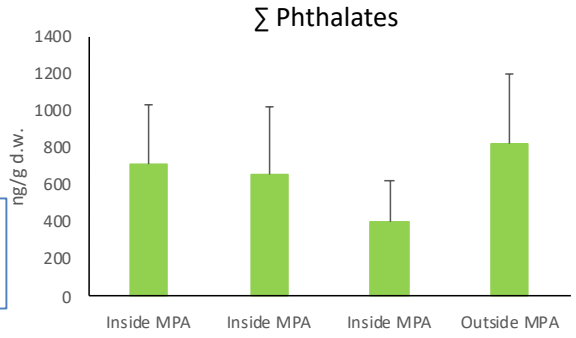
Biomarkers

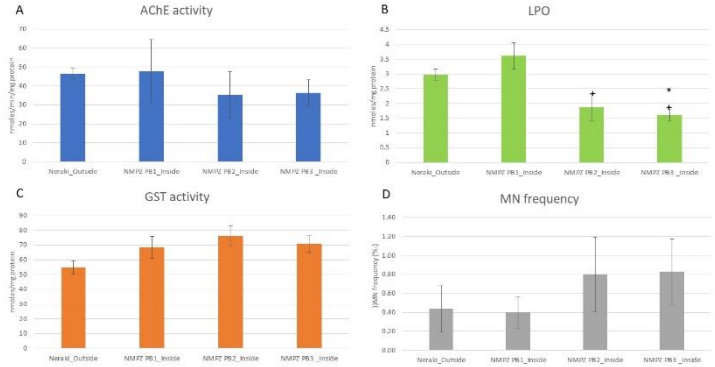


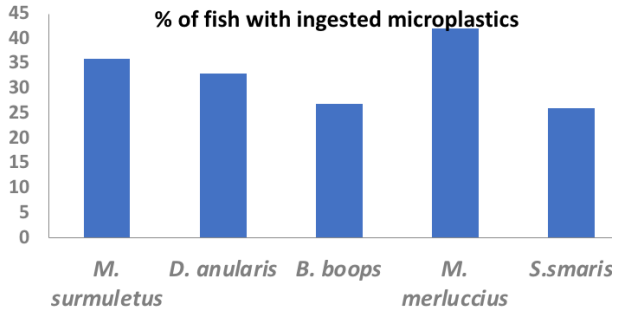
Mussels: 0.40 ± 0.08 items per individual
up to 2 items per individual

Sea urchins: 0.18 ± 0.07 items per individual
up to 1 item per individual

Mytilus galloprovincialis

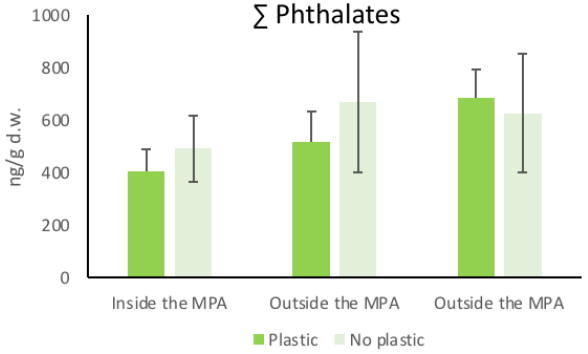


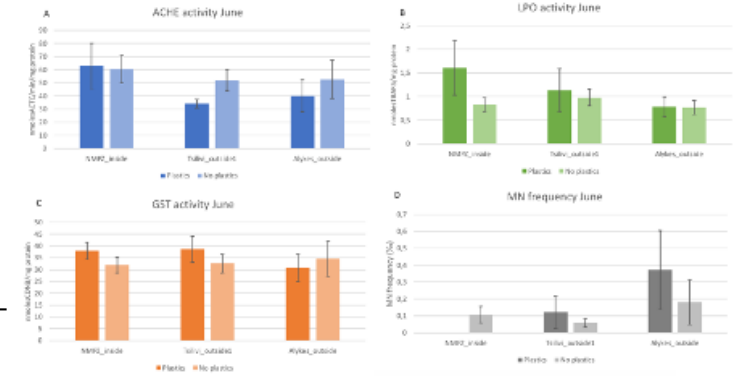




Fish species: 0.44 ± 0.04 items per individual
up to 3 items per individual

Mullus surmuletus





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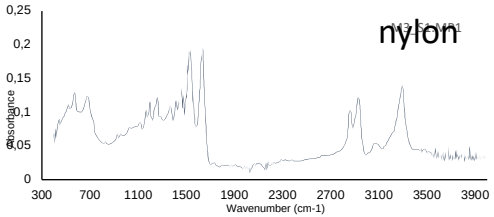
Marine litter in endangered species

Micro litter

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

Macro litter



17% of sea turtles examined (N=6) found with ingested litter
Average number of items/individual: 0.17

in collaboration with Archipelagos περιβάλλον και ανάπτυξη environment and development

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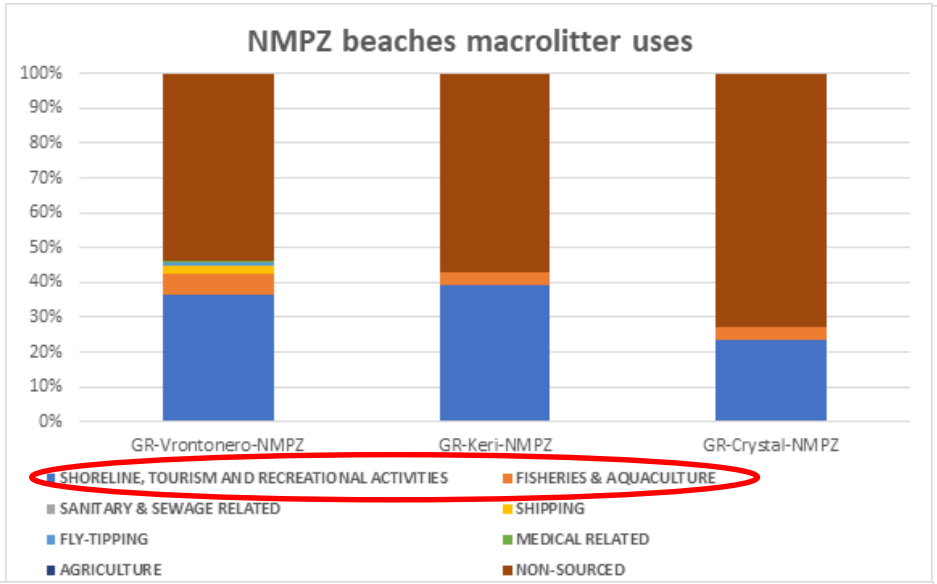
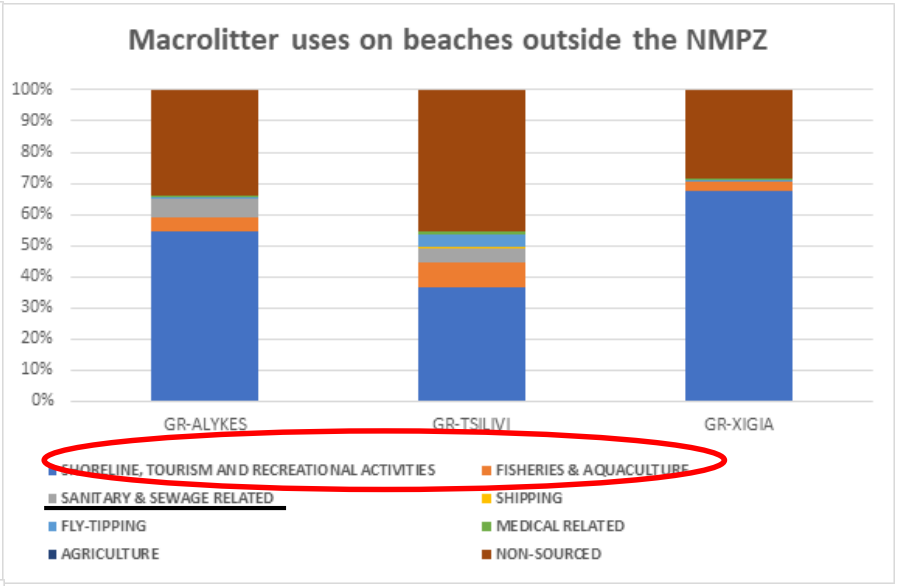
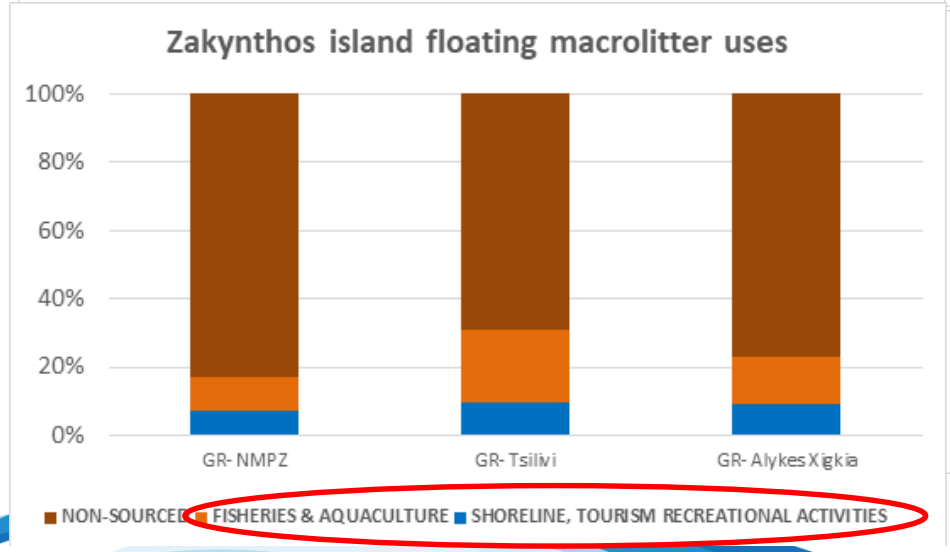
Overview of marine litter status in Zakynthos island

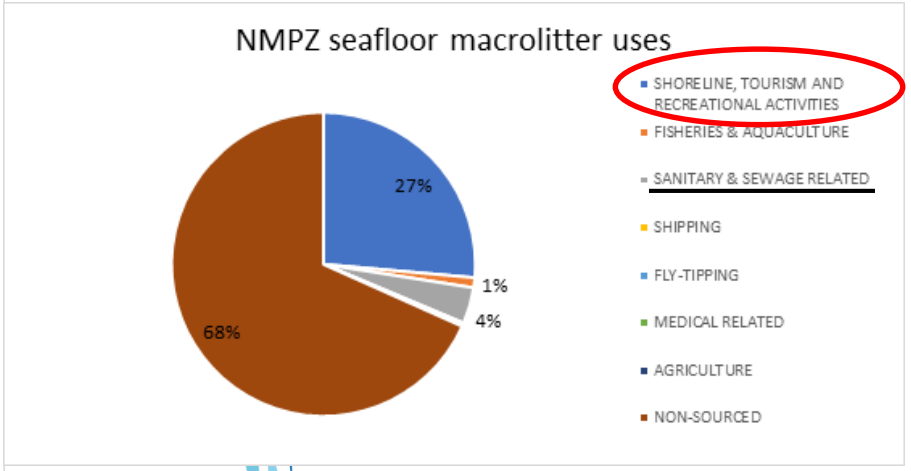
	Macro litter density /micro litter abundance
Beach macro-litter	Exceeds EU threshold and baseline value, comparable to reported values in Greek and Mediterranean waters
Beach micro-litter	Comparable to reported values in Greek and Mediterranean waters
Floating macro-litter	Comparable to reported values in Mediterranean waters
Floating micro-litter	Comparable to reported values in Greek and Mediterranean waters
Seafloor macro-litter	Lower than reported values in Greek and Mediterranean waters
Micro-litter in commercial species	In the low range of reported values in Greek and Mediterranean waters
Marine litter in endangered species	In the low range of reported values in Greek and Mediterranean waters

Marine litter sources in Zakynthos island









Relevant mitigation actions

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Lessons learned

- The implementation of the Plastic Busters MPAs monitoring protocol provided knew knowledge on the amount, composition and sources of marine litter in the National Marine Park of Zakynthos and adjacent area, as well as, on the amount of litter and micro-litter ingested by resident marine animals, and allowed investigation of potential impacts on their health
- Collaboration between scientists and MPA managers was essential for pilot monitoring in the MPA
- Carrying capacity of the MPA management authority increased (know how, man power, equipment use)
- Outputs can be transferred to MPA management design and mitigation actions
- Replicability is feasible through the joint efforts of MPA managers and scientists

Thank you

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