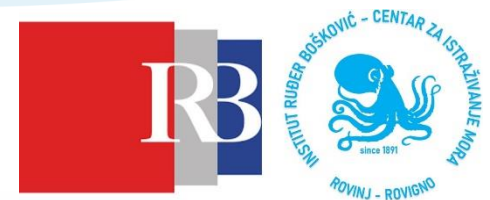




Brijuni National Park, Croatia

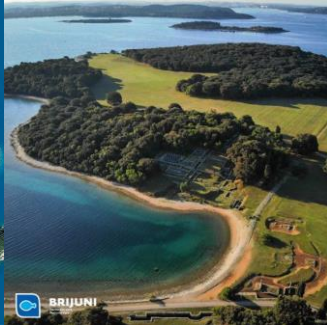
dr. sc. Mirta Smodlaka Tanković, Ruđer Bošković Institute,
Center for Marine Research

Plastic Busters MPAs Capitalization Event | 12 October 2021



Project co-financed by the European
Regional Development Fund

Brijuni National Park



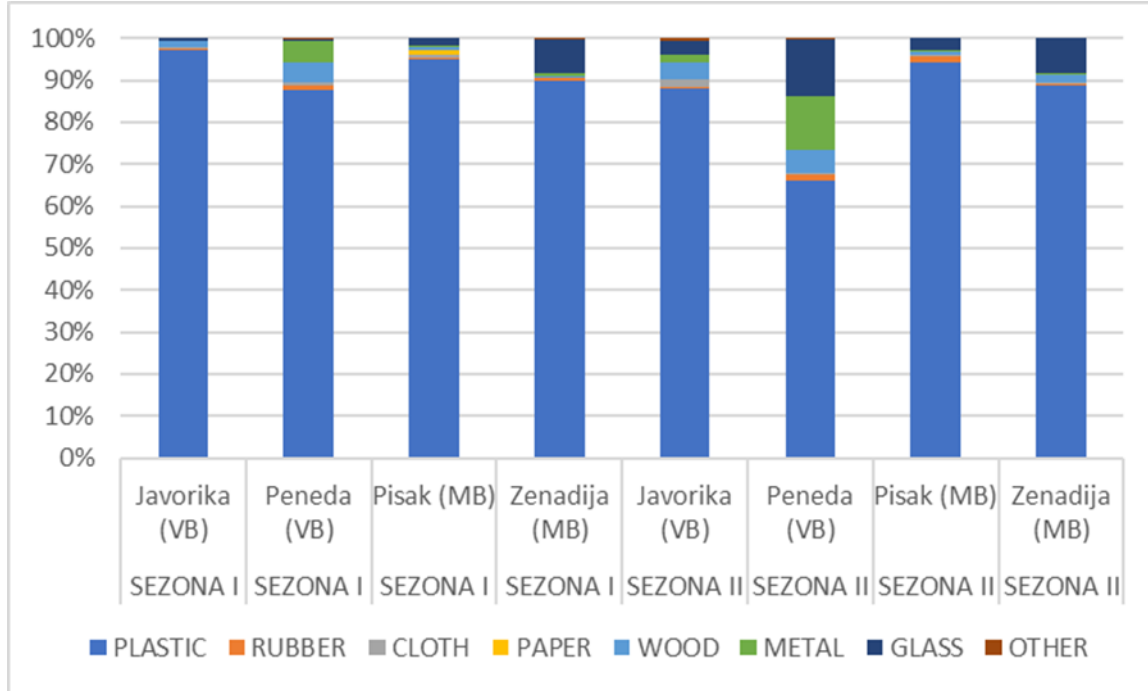
- West coast of Istria, Croatia (northern Adriatic sea)
- 14 islands and islets
- total area 33.9 km²
- island and sea area (80 % sea)
- management structure (National, no private owners)

- Beach litter (macro and micro litter)
- Floating litter (macro and micro litter)
- Seafloor litter
- Litter in biota



- 4 locations, 2 seasons
- Semi-rural, remote/natural
- 12 648 items analyzed
- Total weight of litter: 382 kg

Beach litter



PLASTIC: 88 ± 9 %

25% G67 Sheets, industrial packaging, plastic

SOURCE: 19 ± 5.81 % COSTAL ACTIVITES, 18% ± 9.50 % FISHERY

AVG: 3.02 ± 2.17 items/m²

Season	Location	items/m ²	CCI
Season I	Javorika (VB)	5.10	102
Season I	Peneda (VB)	0.67	13
Season I	Pisak (MB)	5.42	108
Season I	Zenadija (MB)	4.90	98
Season II	Javorika (VB)	0.48	10
Season II	Peneda (VB)	0.70	14
Season II	Pisak (MB)	2.62	52
Season II	Zenadija (MB)	4.32	86

	particles/kg
Javorika (VB)	3236 ± 664
Peneda (VB)	3592 ± 15
Pisak (MB)	4851 ± 2146
Zenadija (MB)	3997 ± 695

AVG: 3919 ± 1097 particles/kg



MACROLITTER:

	items/km2
Transekt 1	23.50
Transekt 2	70.51
Transekt 3	376.03
Transekt 4	399.53
Transekt 5	47.00
Transekt 6	0
Transekt 7	0
Transekt 8	0
Transekt 9	47.00
Transekt 10	0
Transekt 11	0
Transekt 12	0

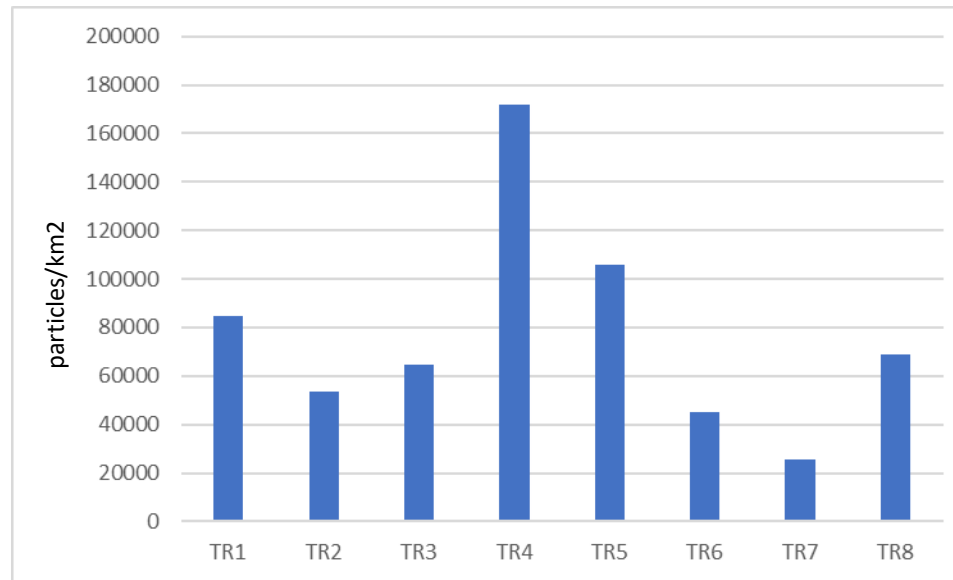
AVG 80.30 ± 145.72 items/km2

78% G79 Plastic pieces 2.5 cm > < 50cm



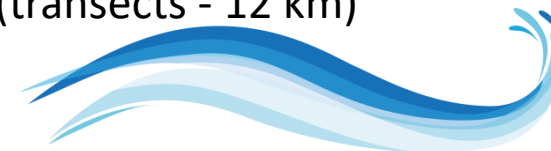
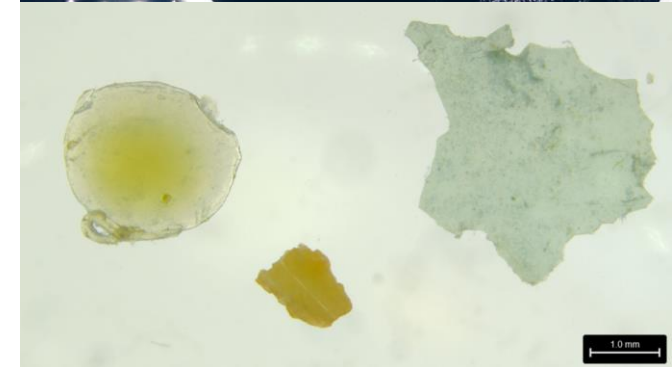
Floating litter

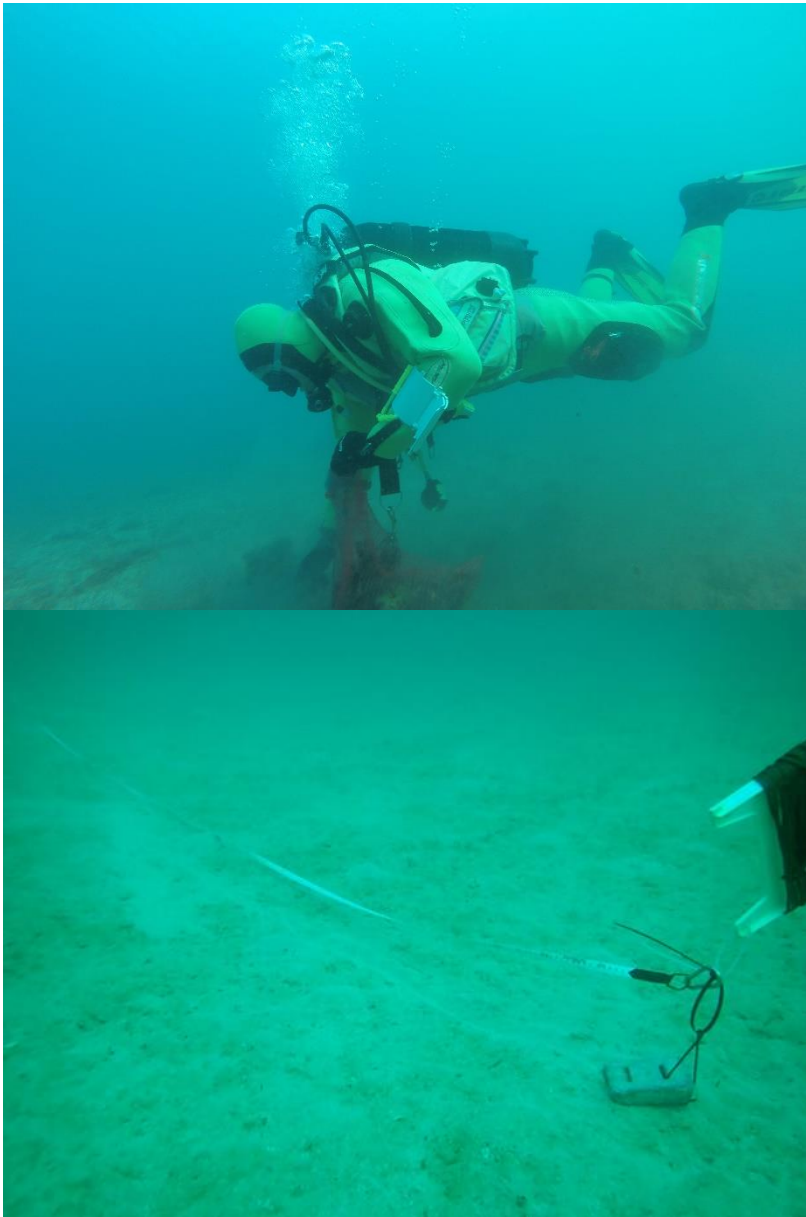
MICROLITTER:



AVG 77.6E+03 ± 45.3E+03 particles/km2

AREA 51 060 m2 (transects - 12 km)

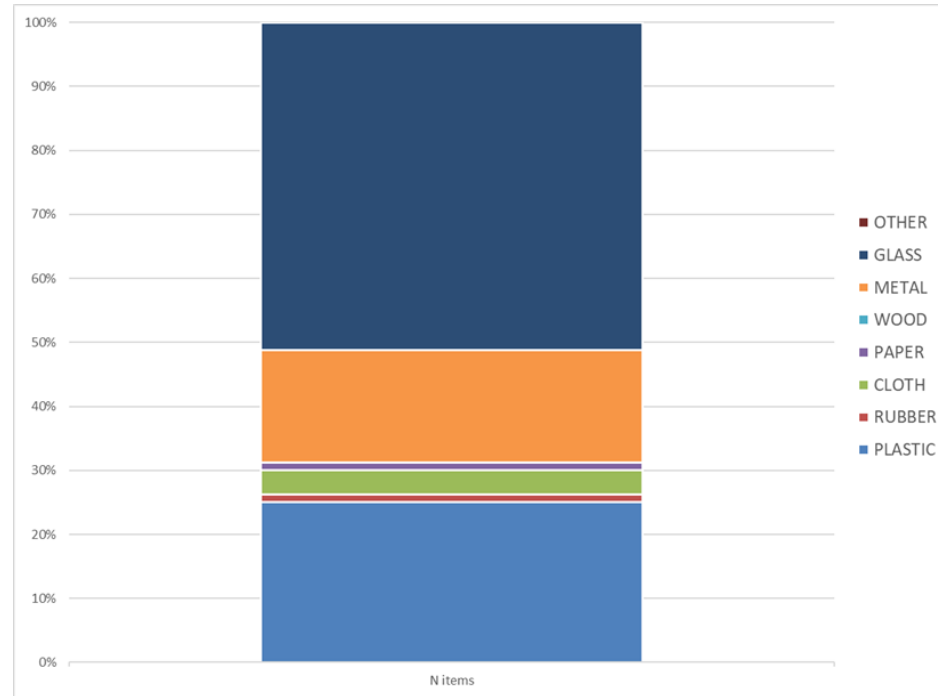




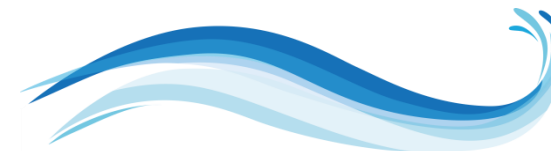
Seafloor litter

8 items/100 m²

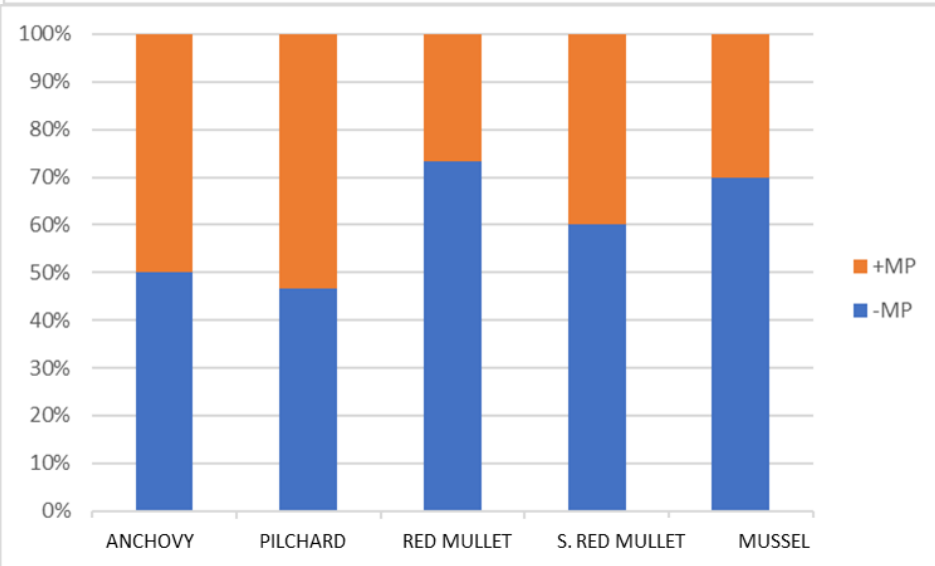
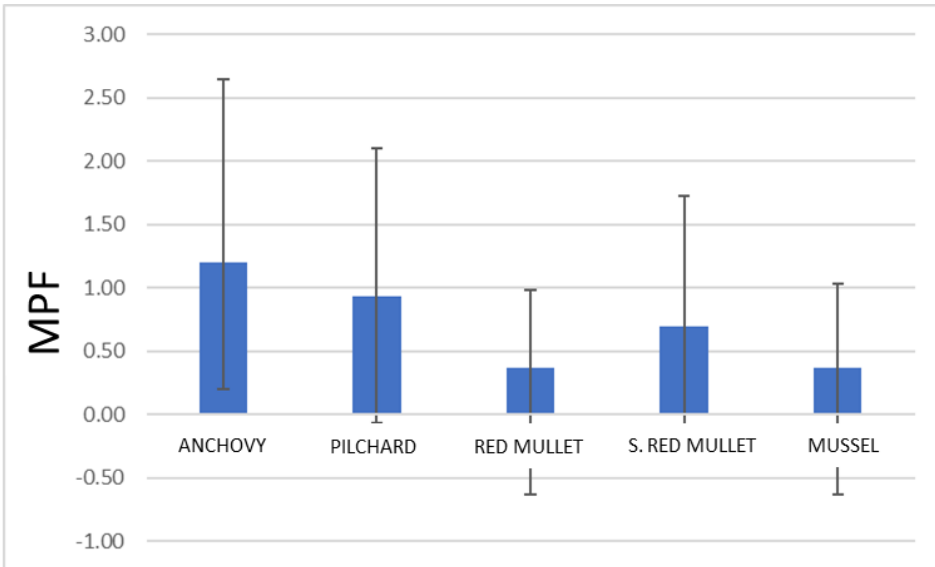
Source: 18 % Coastal activities, 5% Fishery



51 % G208 Glass or ceramic fragments >2.5cm
 17% G198 Other metal pieces < 50 cm



Litter in biota



European anchovy (*Engraulis encrasicolus*)



European pilchard (*Sardina pilchardus*)



Red mullet (*Mullus barbatus*)



Striped red mullet (*Mullus surmuletus*)



Mediterranean mussel (*Mytilus galloprovincialis*)



Frequency + MP: 1-2
 $\leq 40\%$ +MP



Overall



Beach Macrolitter	3.02 ± 2.17 items/m ²
Beach Microlitter	3919 ± 1097 particles/kg
Floating Macrolitter	80.30 ± 145.72 items/km ²
Floating Microlitter	77.6E+03 ± 45.3E+03 particles/km ²
Bottom Litter	8 items/100 m ²
Litter in biota	40% +MP individua

Red: above Croatian AVG (IPA DeFishGear 2017)
Blue: under Croatian AVG (IPA DeFishGear 2017)



Prevention & mitigation

1. Adopt-a-beach
2. Banning SUP
3. Developing a network of collection points

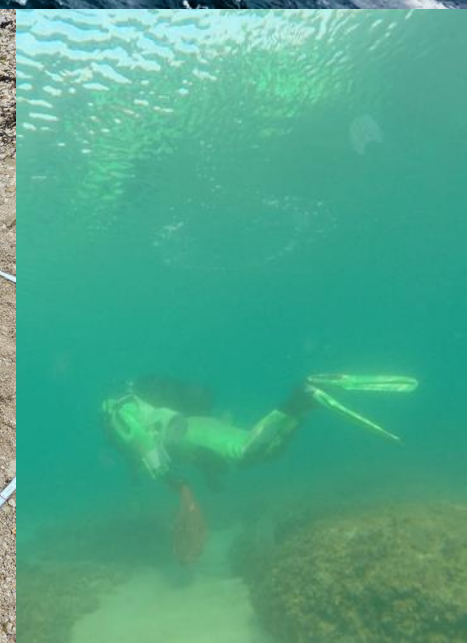


Lessons learned

- The majority of the litter source: costal activities and fishery
- Composition of the litter: the litter is not produce in the MPA
- Indication that the major input is from the cities near the MPA
- Specificity of the costal morphology, high CCI (“funnel bay effect”)
- Beach microlitter “concentration” – very high due the lack of sand beaches
- Good example – cooperation with the MPA management

Acknowledgement:

- Faculty of Civil Engineering, Architecture and Geodesy, Split, Croatia
- NP Brijuni
- Croatian Army
- MINGOR
- CIM Team





Thank you



dr. sc. Mirta Smodlaka Tanković, *IRB, Center for Marine Research*
mirta@cim.irb.hr



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