Conserving marine forests: assessing the effectiveness of a Marine Protected Area for *Cystoseira sensu lato* populations in the central Mediterranean Sea

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Supplementary materials

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Table S1 - PERMANOVAs results of the structure and composition of the *Cystoseira s.l.* assemblage among the MPA's zones.

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Source of variation		Structure				Composition			
	df	MS	Model-F	R2		MS	Model-F	R2	
zone	2	0.103	55.027	0.707	***	0.654	40.394	0.643	***
site (zone)	3	0.020	10.706	0.206	***	0.173	10.711	0.256	***
transect(site(zone))	6	0.002	1.237	0.048	ns	0.018	1.131	0.054	ns
Residuals	6	0.002		0.039		0.016		0.048	
Total	17			1.000				1.000	

Note:

Zone was fixed and orthogonal with two levels (zone A, zone B and zone C), site was random and nested in zone with two levels (1 and 2), while transect was random and nested in site and zone with 3 levels (1, 2 and 3). PERMANOVAs based on Bray–Curtis measure of square-root transformed abundances (structure) or Jaccard measure (species presence/absence data) of *Cystoseira s.l.* assemblage. P-values were calculated using 9.999 permutations. Signif. codes: *** $p < 0.001$, ns $p > 0.05$

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Table S2 - PERMANOVAs results of the structure and composition of the *Cystoseira s.l.* assemblage among all areas investigated (MPA's zones and control sites).

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Source of variation		Structure				Composition			
	df	MS	Model-F	R2		MS	Model-F	R2	
area	4	0.104	68.019	0.818	***	0.755	57.042	0.798	***
site (area)	3	0.020	13.101	0.118	***	0.173	13.104	0.138	***

Source of variation		Structure			Composition		
	df	MS	Model-F	R2	MS	Model-F	R2
transect(site(area))	8	0.003	1.640	0.039 ns	0.017	1.285	0.036 ns
Residuals	8	0.002		0.024	0.013		0.028
Total	23			1.000			1.000

Note:

Area was fixed and orthogonal with five levels (zone A, zone B, zone C, white and urban), site was random and nested in zone with one or two levels, while transect was random and nested in site and zone with 3 levels (1, 2 and 3). PERMANOVAs based on Bray–Curtis measure of square-root transformed abundances (structure) or Jaccard measure (species presence/absence data) of *Cystoseira s.l.* assemblage. P-values were calculated using 9.999 permutations. Signif. codes: *** p < 0.001, ns p > 0.05

Table S3 Average similarity of the *Cystoseira s.l.* assemblage between and within the different zones investigated.

	Structure						Composition				
Average	Similarity	between/within	groups				**Average**	Similarity	between/within	groups		
	Zone B	Zone A	white	Zone C	urban			Zone B	Zone A	white	Zone C	urban
Zone B	84.961						Zone B	87.387				
Zone A	47.027	75.826					Zone A	50.869	76.864			
white	51.166	50.167	84.876				white	54.158	56.108	96.078		
Zone C	69.174	57.129	63.98	76.031			Zone C	80.524	58.397	67.48	86.007	
urban	20.577	29.601	34.561	28.46	87.241		urban	34.668	44.507	45.116	36.129	92.593