





Conservation and restoration of large brown algae forests

Mangialajo Luisa^{1,2}, Gianni Fabrizio¹, Pey Alexis¹, Airoldi Laura³, Asnaghi Valentina⁴, Ballesteros Enric⁵, Cebrian Emma^{5,6}, Chiantore Mariachiara⁴, Claudet Joachim^{7,8}, Fraschetti Simonetta⁹, Garcia Maria⁵, Macic Vesna¹⁰



www.coconet-fp7.eu

CoCoNet (Towards COast to **COast NETworks of marine** protected areas (from the shore to the high and deep sea), coupled with sea-based wind energy potential.)



International Training network on Mediterranean Marine Protected Areas

MARINE FOREST



IN THE MEDITERRANEAN SEA



CYSTOSEIRA



PRIMARY PRODUCERS AND HABITAT FORMERS

Ingineers species, they structure the habitat

MARINE FORESTS

HABITAT AMELIORATION (*sensu* Moore et al. 2007)



MARINE FORESTS

• Food, shelter and nursery for several species

PhD Pierre Thiriet



Contents lists available at SciVerse ScienceDirect Journal of Experimental Marine Biology and Ecology



journal homepage: www.elsevier.com/locate/jembe

Nursery value of Cystoseira forests for Mediterranean rocky reef fishes

Adrien Cheminée ^{a, b,*}, Enric Sala ^{b,c}, Jérémy Pastor ^{a, 1}, Pascaline Bodilis ^a, Pierre Thiriet ^a, Luisa Mangialajo ^a, Jean-Michel Cottalorda^a, Patrice Francour^a

Global Change Biology (2014) 20, 3300-3312, doi: 10.1111/gcb.12619

RESEARCH REVIEW

Identifying the interacting roles of stressors in driving the global loss of canopy-forming to mat-forming algae in marine ecosystems



Conservation state?



Contents lists available at ScienceDirect

Journal of Sea Research

journal homepage: www.elsevier.com/locate/seares

European seaweeds under pressure: Consequences for communities and ecosystem functioning

Frédéric Mineur ^{a,b,*}, Francisco Arenas ^c, Jorge Assis ^d, Andrew J. Davies ^e, Aschwin H. Engelen ^d,

Advances in Oceanography and Limnology, 2013 Vol. 4, No. 2, 83–101, http://dx.doi.org/10.1080/19475721.2013.845604





Conservation and restoration of marine forests in the Mediterranean Sea and the potential role of Marine Protected Areas

Fabrizio Gianni^a*, Fabrizio Bartolini^a, Laura Airoldi^{b,c}, Enric Ballesteros^d,

Research Article ut^{a,e} and

Mediterranean Marine Science Indexed in WoS (Web of Science, ISI Thomson) and SCOPUS The journal is available on line at http://www.medit-mar-sc.net DOI: http://dx.doi.org/10.12681/mms. 1032



Decline and local extinction of Fucales in the French Riviera: the harbinger of future extinctions?

T. THIBAUT^{1,2}, A. BLANFUNÉ^{1,2}, C.F. BOUDOURESQUE¹ and M. VERLAQUE¹

SEA RESEAR

CYSTOSEIRA FORESTS LOSS

• We are now aware of marine forests loss at the global scale



Lack of historical data (tricky identification)

HERBIVORES PROLIFERATION (OVERFISHING)



HERBIVORES PROLIFERATION (OVERFISHING)



HERBIVORES PROLIFERATION (OVERFISHING)



REGIME SHIFTS TO BARREN GROUNDS

DESTRUCTIVE FISHING

Lithophaga lithophaga (date mussel) ILLEGAL fishery







Herbivores exclusion experiment

Quantification of herbivourous pressure:

62% loss in biomass

87% loss of reproductive potential

• Underestimated role of salemas in mediterranean forests loss?







SHOULD WE REFOREST?

Recovery of date mussels destructive fishery grounds



EXPERIMENTAL DESIGN

- SEA URCHINS EXCLUSION,



2 levels, fixed

- SALEMAS EXCLUSION,

2 levels, fixed

- RECRUITMENT ENHANCEMENT



2 levels, fixed

http://www.coconet-fp7.eu/



Set up of the expt in July 2014, Montenegro – up to january 2015



RECOVERY OF DATE MUSSELS DESTRUCTIVE FISHERY GROUNDS

Source	df	MS	Pseudo-F	P(perm)
URCHINSexclusion	1	1165.6	64.492	0.001
SALEMAS exclusion	1	438.74	24.275	0.001
RECRUITMENT ENHANC.	1	771.05	42.661	0.001
URCH x SAL	1	356.76	19.739	0.001
URCH X RECR_ENHANC	1	529.96	29.322	0.001
SAL X RECR_ENHANC	1	151.67	8.3916	0.006
URCH x SAL x RECR_ENHANC	1	92.034	5.092	0.024
Residuals	78	18.074		

85



Effects of both herbivores exclusion and recruitment enhancement (all factors are interacting)

RECRUITMENT ENHANCEMENT EFFECT

HERBIVORES EXCLUSION EFFECT



ECOLOGICAL RESTORATION INSIGHTS



- Conservation of existing forests should always be the priority
- When necessary, restoration of damaged/lost forests should be considered
- Non destructive techniques are possible
- Always controlling the drivers that caused the damage/loss (both biotic and abiotic factors)
- Before implementation of restoration actions, the herbivorous pressure should be assessed (and if necessary, herbivores should be controlled)

LOGICAL FRAMEWORK FOR RE-FORESTATION



HOW MUCH DOES MARINE FORESTS CONSERVATION COSTS?

Review Article

Mediteranean Marine Science Indexed in WoS (Web of Science, ISI Thomson) and SCOPUS The journal is available on line at http://www.medit-mar-sc.net

Assessment of goods and services, vulnerability, and conservation status of European seabed biotopes: a stepping stone towards ecosystem-based marine spatial management

M. SALOMIDI¹, S. KATSANEVAKIS^{1,2}, Á. BORJA³, U. BRAECKMAN⁴, D. DAMALAS⁵, I. GALPARSORO³, R. MIFSUD⁶, S. MIRTO⁷, M. PASCUAL³, C. PIPITONE⁸, M. RABAUT⁴, V. TODOROVA⁹, V. VASSILOPOULOU¹ and T. VEGA FERNÁNDEZ⁸

Table 1. Summary of Goods and Services provided by each seabed biotope, as assessed in the present catalogue: the three major evaluation classes ("High", "Low", "Negligible / Irrelevant / Unknown") are given in dark blue, light blue and white respectively.

Biotope	Food provision	Raw materials	Air quality and climate regulation	Disturbance and natural hazard prevention	Water quality regulation / Bioremediation of waste	Cognitive benefits	Leisure, recreation and cultural inspiration	Feel good or warm glow	Photosynthesis, chemosynthe- sis, and primary production	Nutrient cycling	Reproduction and nursery areas	Maintenance of biodi- versity
Mediterranean and Pontic communities of infralittoral algae very exposed to wave action												
Kelp and red seaweeds (moderate energy infralittoral rock)												
Mediterranean and Pontic communities of infralittoral algae moder- ately exposed to wave action Mediterranean submerged fucoids, green or red seaweeds on full salin- ity infralittoral rock												

THANK YOU FOR YOUR ATTENTION







Ecology of Coastal Marine Ecosystems and Response to Stress



