Mediterranean ecosystem

Restoration sites

Restoration of Mediterranean macroalgal forests in Spain

Macroalgal forests dominated by species of the genera *Cystoseira sensu lato*, (including *Ericaria, Gongolaria* and *Cystoseira*; order Fucales), represent one of the most productive and biodiverse marine coastal ecosystems, directly or indirectly supporting and regulating, ecosystem and cultural services.

Macroalgal forests are severely threatened under the pressure of multiple stressors acting at local to global scales, including pollution, habitat destruction, eutrophication, sedimentation, overgrazing, marine heatwaves and ocean warming. As many other habitat-forming macroalgal species worldwide, *Cystoseira s.l.* forests have been declining in the whole Mediterranean basin during the last decades, and natural recovery has been recorded only occasionally.

General information

SPAIN

Organisation
Centre d'Estudis Avançats de Blanes, (CEAB-CSIC)-Spain.

University Napoli Federico II - Italy.

University Politecnica delle Marche - Italy.

Université Côte d'Azur, Nice - France.

Hellenic Centre for Marine Research – Greece

Type of organisation
Research or academia (incl. tertiary education)

Contact person
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Website
http://afrimed-project.eu/
http://www.marineforest.com/
http://www.merces-project.eu/

Site location
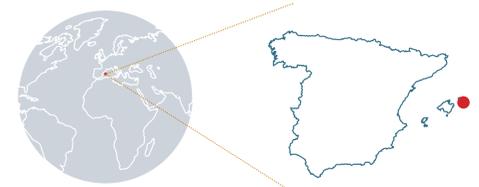
Latitude
39°52'47.6"N

Longitude
4°18'28.2"W

Implementation area in 2011
~20 m²
(4 patches of ~5m²)

Restored area in 2021
2093 m²

Impact
Restoration of associated biodiversity and ecosystem functions

Method
Recruitment enhancement or provision of new recruits

Scan the code for full description

Main drivers of degradation

- Impaired seawater quality, due to the dumping of urban and industrial sewage.
- Infrastructure and industrial development and urbanization

What is the practice about

- Given the threatened and critical conservation status of many populations of *Cystoseira s.l.*, adult transplants from remaining populations are undesirable and less invasive techniques are required.

- The applicability of several non-destructive techniques based on recruitment enhancement for macroalgae restoration has been experimentally explored; however, these techniques have been less effectively applied to restore forest-forming fucoids.

- Successful restoration of a population of *Gongolaria barbata* (i.e., to self-maintaining populations) in areas from which they had completely disappeared at least 50 years ago using recruitment-enhancement techniques

- Publication of a roadmap for the restoration of Mediterranean macroalgal forests to assist researchers and stakeholders in decision-making. This roadmap provides guidelines for an optimal selection of the site to restore, the target species, the donor population and the most effective methods and complementary actions in terms of cost-effectiveness

- Elaboration of a complete conceptual framework of the "Best practices for the restoration of Mediterranean macroalgal forests (*Cystoseira s.l.*)". The framework consists in a simple stepwise decision tree with additional information about key elements (restoration implementation, success evaluation and long term adaptative management) to be considered around a restoration action.

Achievements and impact

- After 6 years, the densities and size structure distributions of the restored populations were similar and comparable to those of the natural reference populations, highlighting that the restored populations were self-sustaining and mature.

- After 10 years, the restored patches extended their surface by almost three orders of magnitude, reaching an area of 2093 m2, and species diversity and composition of the restored locality were similar to those found in reference macroalgal forests, showing the recovery of the forest ecosystem.

Scan the code for more information about Mediterranean Ecosystem Restoration sites

UNITED NATIONS DECADE ON
ECOSYSTEM RESTORATION
2021-2030