

Marine Habitat Mapping: Supporting the Nature Restoration Law



Prof. Simonetta Fraschetti

Chair of EMB Working Group on Marine Habitat Mapping
Professor of Ecology at University of Naples Federico II &
Stazione Zoologica Anton Dohrn (SZN), Italy

EMB Working Group: Marine Habitat Mapping



Working Group Members

Chair: **Simonetta Frascetti**, University of Naples Federico II & Stazione Zoologica Anton Dohrn (SZN), Italy

Co-Chair: **James Strong**, National Oceanography Centre (NOC), UK

Eimear O’Keeffe, Marine Institute (MI), Ireland

Maria Salomidi, Hellenic Centre for Marine Research (HCMR), Greece

Timm Schoening, Helmholtz Centre for Ocean Research (GEOMAR), Germany

Federica Foglini, Institute of Marine Science (CNR-ISMAR), Italy

Helen Lillis, Joint Nature Conservation Committee (JNCC), UK

Jorge Goncalves, Centre of Marine Sciences of the Algarve (CCMAR), Portugal

Georg Martin, Estonian Marine Institute, University of Tartu, Estonia

Mats Lindegarth, University of Gothenburg, Sweden

Lene Buhl Mortensen, Institute of Marine Research (IMR), Norway

Lenaick Menot, Ifremer, France

José Manuel González-Irusta, Spanish Institute of Oceanography (IEO), Spain

António Pascoal, Instituto Superior Técnico (IST), Portugal

EMB Secretariat support: **Britt Alexander, Sheila Heymans**

Kick-off meeting April 2022

EMB Working Group: Marine Habitat Mapping

Future Science Brief to be launched in Winter 2023/2024 covering:

- **Chapter 1: Introduction**

- What is marine habitat mapping, why is it important, MHM initiatives, challenges

- **Chapter 2: Collecting data for marine habitat mapping**

- Current methods and future trends in collecting remotely sensed data and in situ data; data collection platforms; artificial intelligence

- **Chapter 3: Combining data to produce habitat maps**

- Physical habitat maps; distribution models; marine habitat classification schemes

- **Chapter 4: What to map: where and when**

- What has been mapped; gaps in terms of sea basins and habitat types; who uses marine habitat maps and for what purpose, thematic alignment between maps and uses (MSFD, MPA and restoration case-studies)

- **Chapter 5: Communication and dissemination**

- The benefits of using marine habitat maps to improve the public understanding of the Ocean; presenting marine habitat maps; assessing and communicating uncertainty and confidence; data dissemination and increasing the value of each map; getting maps into EMODnet

- **Chapter 6: Future challenges and opportunities**

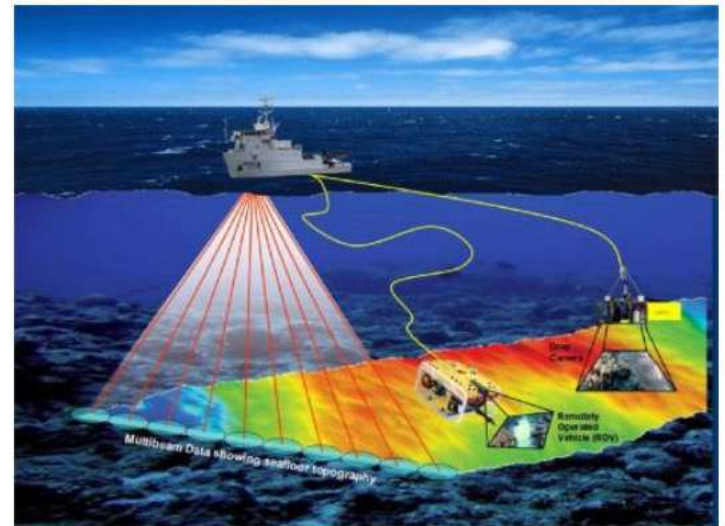
- Overview of key recommendations

What is Marine Habitat Mapping and why is important ?



Marine habitat maps:

- provide spatial representation of marine habitats, associated biological communities, areal extent, ecological status, physical conditions
- enable spatial management actions: the designation of marine protected areas (MPAs), distribution of human uses, and the strategic placement of restoration areas cannot be effectively done **without knowledge on habitat distribution and extent.**



The Nature Restoration Law

Overarching Aims:

- To repair the 80% of European habitats that are in poor condition: **do we know where they are?**
- Legally binding restoration targets and obligations: restoration should cover at least 20% of EU's land and sea areas by 2030, and all areas in need of restoration by 2050: **do we know where to allocate them?**
- Member states to develop restoration plans to reach these targets at national level: **does MSP presently include restoration?**

For Marine Habitats:

- Improve degraded areas to good condition with restoration measures in place on at least 30 % of the degraded area by 2030, at least 60 % by 2040, and at least 90 % by 2050
- re-establish habitat types on at least 30 % of the additional overall surface needed to reach the area necessary for long-term viability by 2030, at least 60 % of that surface by 2040, and 100 % by 2050
- improve the quality and quantity of habitats, including by re-establishing them, and enhance connectivity, until sufficient quality and quantity of those habitats is achieved

**Need of fine scale data
/ baseline information**

**Need of coordination
/harmonization with
the other EU Directives**

How can Marine Habitat Mapping support the Nature Restoration Law?

The Nature Restoration Law will demand a **profound knowledge of the distribution and extent of European habitats**, including marine habitats, in order to assess the percentage of each habitat in poor condition and therefore suitable for restoration measures.

Fine-scale information based on **high-quality data** on habitat location and status is needed to plan large-scale restoration interventions to ensure the accuracy of desired outputs.

However, there is currently a **lack of spatial information** on degraded habitats and a **lack of monitoring data** on trends in habitat condition:

- (a) limited geographic coverage at both the regional and sub-regional level;
- (b) insufficient spatial resolution and accuracy in recorded data for the planning of conservation and restoration actions;
- (c) lack of access to background data and metadata upon which maps are based, thus limiting the potential for synthesis of multiple data sources.

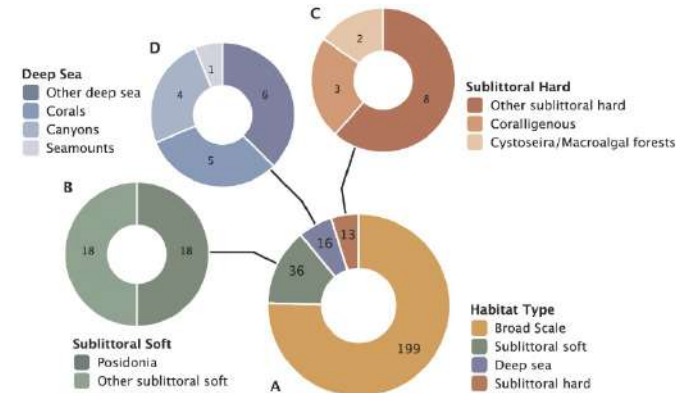


Fig. 3. The number of records per habitat type (A), broken down by sublittoral soft (B), sublittoral hard (C) and (D) deep-sea habitats.



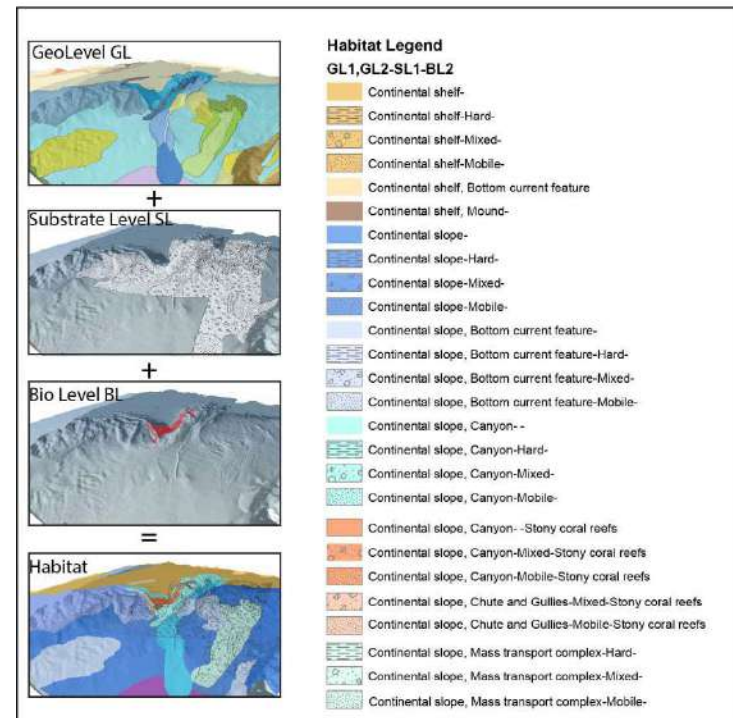
Human activities and resultant pressures on key European marine habitats: An analysis of mapped resources

Thanos Dailianis^{a,*}, Christopher J. Smith^b, Nadia Papadopoulou^a, Vasilis Gerovasileiou^a, Katerina Sevastou^a, Trine Bekkby^c, Meri Bilan^d, David Billett^e, Christoffer Boström^f, Marina Carreiro-Silva^g, Roberto Danovaro^h, Simonetta Fraschetti^h, Karine Gagnonⁱ, Cristina Gambi^j, Anthony Grehan^k, Silvija Kipson^l, Jonne Kotta^m, Chris J. McOwenⁿ, Telmo Morato^o, Henn Ojaveer^p, Christopher K. Pham^q, Rachael Scrimgeour^r

Habitat Classification Schemes

Classification schemes are important tools to record and represent habitat status. Recommendations for their improvement include:

- **Consistent definitions** are needed within and between classification schemes. This is important for consistent classification and representation of habitats in maps and their use to monitor change over time.
- **Add additional attributes to habitat descriptions** such as sensitivity, conservation status, ecosystem service provision



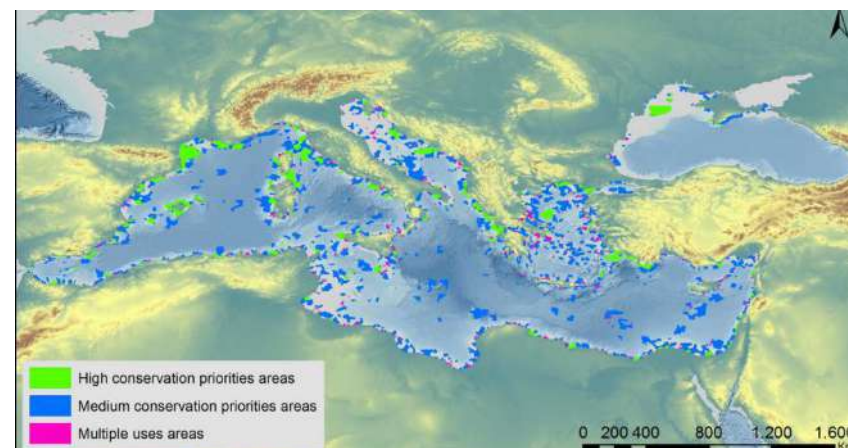
How can Marine Habitat Mapping support the Nature Restoration Law?

Marine habitat maps can fill gaps and provide essential information to support restoration efforts including:

- **Location of degraded habitats;**
- Size, number, shape and **connectivity** of existing units of habitats;
- **Real data** can support better habitat/species **distribution modelling** for the strategic positioning of restoration projects;
- Marine habitat mapping techniques (e.g. side-scan sonar, multibeam sonar, drop-down camera surveys) can be used to **monitor the spatial extent of restoration projects;**
- **Standardization and sharing** of marine habitat mapping data support restoration activities;
- Spatial information on distribution of **direct and indirect human activities and pressures** has to be incorporated into marine habitat mapping to assess the feasibility and long-term suitability of restoration sites and to inform prioritisation for restoration activities;
- Provide guidance for the **identification of suitable restoration targets** as proposed by the Nature Restoration Law.



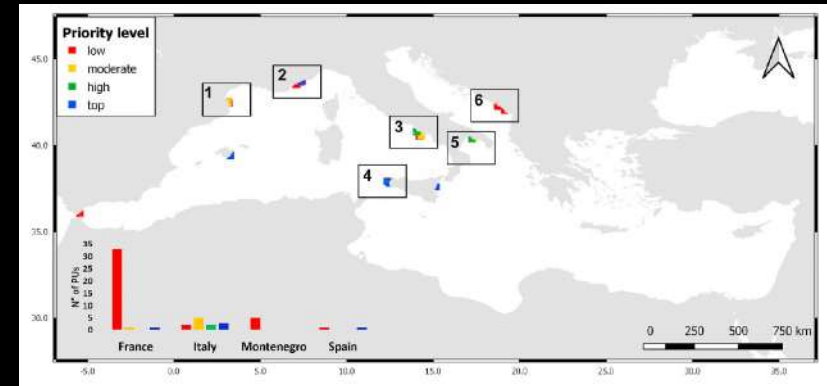
Systematic conservation planning: criteria for site prioritization



Criteria for site prioritization: systematic restoration planning

Which **criteria** do you think are essential for prioritising habitats/species for marine restoration?

- Historical presence of the habitat/species focus of restoration
- Suitability of the current and the future environmental conditions
- Feasibility of the restoration intervention in terms of costs and availability of facilities
- A stepping-stone approach to enhance habitat connectivity so that restoration success can be further strengthened and upscaled.



Contents lists available at ScienceDirect

Journal of Environmental Management

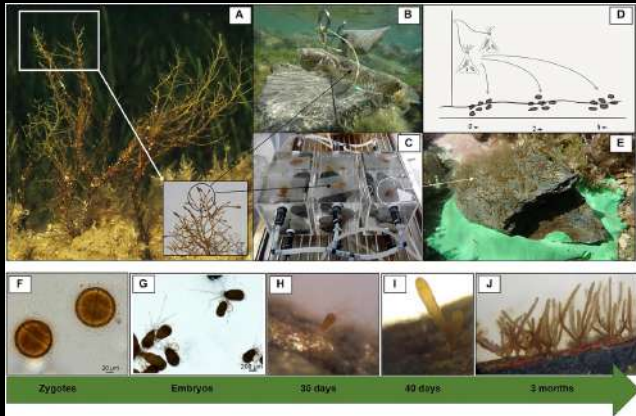
journal homepage: www.elsevier.com/locate/jenvman

Research article

The challenge of setting restoration targets for macroalgal forests under climate changes

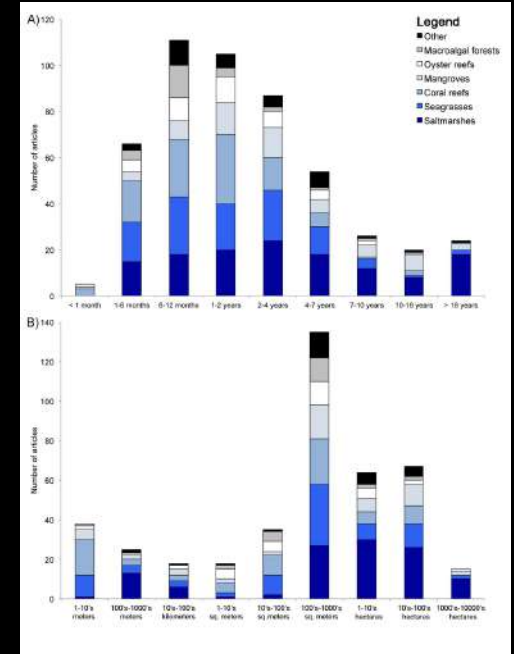
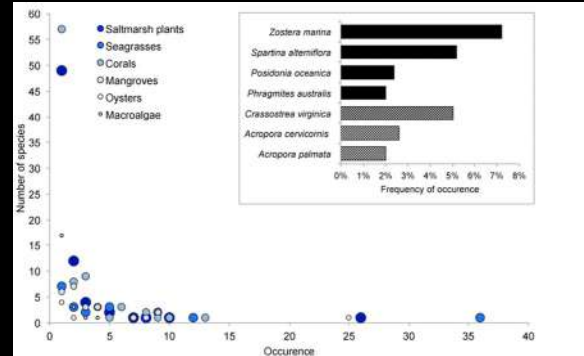
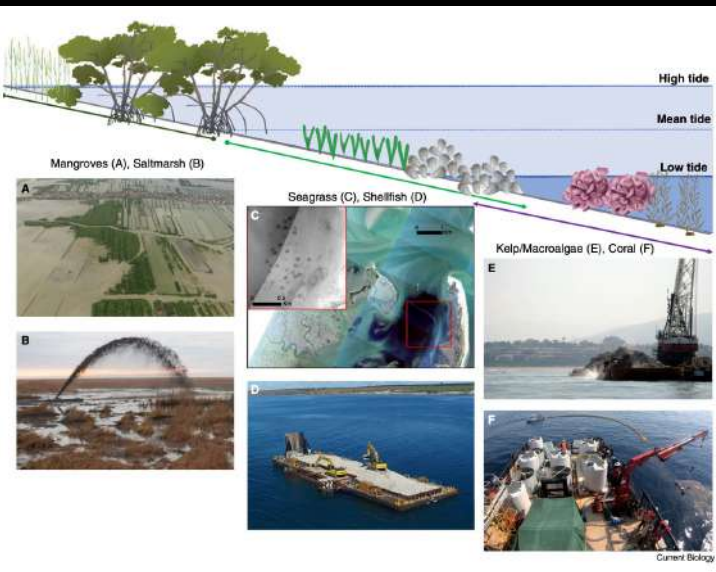
Erika Fabbrizzi^{a,b,c}, Sylvaine Giakoumi^b, Francesco De Leo^a, Laura Tamburello^b, Antonia Chiarore^b, Alberto Colletti^a, Marianna Coppola^a, Marco Munari^b, Luigi Musco^{b,c}, Fabio Rindi^d, Lucia Rizzo^{b,c}, Beatrice Savinelli^b, Giulio Franzitta^b, Daniele Grech^f, Emma Cebrian^{g,h}, Jana Verduraⁱ, Silvia Bianchelli^d, Luisa Mangialajo^j, Ina Nasto^k, Denada Sota^l, Sotiris Orfanidis^h, Nadia K. Papadopoulou^l, Roberto Danovaro^{b,d}, Simonetta Fraschetti^{a,m}

A lot of data of few groups



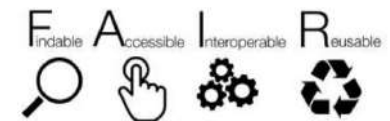
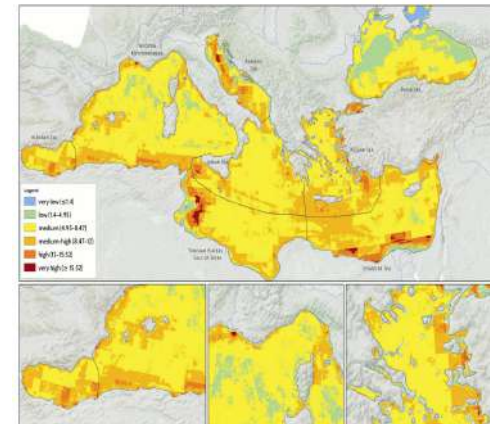
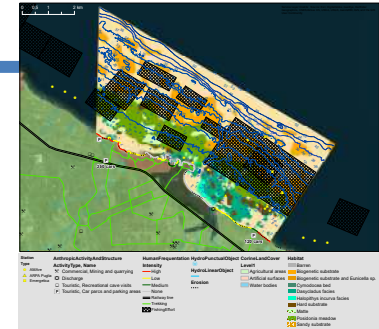
Restoration of a Canopy-Forming Alga Based on Recruitment Enhancement: Methods and Long-Term Success Assessment

Jana Verdura^{1*}, Marta Sainza², Eric Balasteros³, Maria Elena Cofa^{1†} and Emma Cebrian¹



Recommendations

- **Gaps in the spatial coverage of habitat maps:** coordinate, commission and resource mapping studies and programs to close priority gaps.
- **The Ocean is 4D:** time and water column should be better represented
- **Increase the extent and thematic resolution of biological information in marine habitat maps**
- **Include habitat condition/status within both the collection of mapping data and the presentation of final maps,** with a focus on habitat mapping in **coastal areas** (most degraded by human activities so of critical importance to inform restoration).
- Maximise use of **technological development** (including AI, blue robotics).
- **Mandate the publication of mapping products in FAIR data repositories** to allow for reuse in further studies and decision processes.



Other EMB activities relevant for the Nature Restoration Law

EMB Working Group on Coastal Resilience *(Position Paper to be launched on 10 – 11 October at EurOCEAN conference, Vigo, Spain)*

- The restoration of some coastal habitats (e.g. kelp forests, seagrass meadows, oyster reefs and mussel beds) is a nature-based solution that can reduce the risk of climate impacts (e.g. sea-level rise, flooding, storm surges, coastal erosion, landslides).
- **Focus on the restoration of habitats that are able to persist in the face of climate change.**
- Impacts of **warming, storminess, sea-level rise and acidification** on coastal habitats must be assessed.

EMB Working Group on Blue carbon *(Policy Brief to be launched in Summer/Autumn 2023)*

- Marine habitat maps will help to **locate blue carbon ecosystems** (i.e. those with potential to remove and store carbon).

EMB Working Group on Ocean oxygen *(Future Science Brief launched on 8 June 2023)*

- **Reduce multiple stressors and increase the protection of marine ecosystems**, especially in deep-sea ecosystems, to increase the resilience of marine ecosystems to deoxygenation.
- This can be achieved through **passive restoration i.e. removal of pressures**

EMB Working Group on Offshore Renewable Energy *(Future Science Brief launched in April 2023)*

- The Nature Restoration Law will **increase the competition for marine space** and impact the selection of viable locations for offshore renewable energy.
- Marine habitat maps are necessary to develop **marine spatial plans**. Areas designated for protection and restoration should be avoided.

Thank you for your attention!

