



LIFE MAPPER

MAPping, ProtEcting, and Restoring Marine Ecosystems



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MAPping, ProtEcting, and Restoring Marine Ecosystems

LIFE24-PRE-IT-LIFE-MAPPER

Guidelines for MAPping, ProtEcting, and Restoring Marine Ecosystems

Deliverable or Milestone	Work Package 2 – Milestone 3
Prepared by	UNINA
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History of changes			
Version	Date	Change	Page
1.0	03.07.2026	First version	1-11
1.0	06-07-2026	Upload by coordinator	1-11

Executive Summary

The expert consultation under WP2 has been successfully completed through a dedicated EU Survey involving specialists from research institutions, monitoring agencies and conservation organisations. Expert knowledge is essential for assessing ecosystem condition and identifying ecological thresholds, particularly where empirical evidence remains fragmented, geographically uneven, or insufficient to support operational decision-making. Expert elicitation provides a transparent and scientifically robust mechanism to integrate existing knowledge, validate indicators, identify reference conditions, and evaluate the feasibility of defining thresholds for marine habitats. The results of this consultation constitute a key contribution to the development of a harmonised framework for habitat condition assessment and restoration planning within LIFE MAPPER, supporting future applications under the EU Nature Restoration Regulation, the Habitats Directive and the Marine Strategy Framework Directive.

This initiative has been conceived to complement and capitalize on the effort carried out by BioAgora (<https://bioagora.eu/>) which is focusing on gaps in mapping and in the definition of the condition of the habitats listed in the NRR.

Objectives of the questionnaire

This questionnaire has been designed to gather expert knowledge on:

- the methods and indicators used for habitat condition assessment;
- the existence of reference conditions and thresholds.

Additional details:

Guidelines for Completing the Questionnaire

- Please answer the questionnaire for each habitat (or group of habitats) you selected, based on your knowledge, experience, and available national/regional data. You can answer for multiple habitats.
- You may skip any question for which you do not have information.
- The questionnaire is organized into clear thematic sections (e.g., condition assessment, reference conditions).
- If using a platform that supports it, you may navigate across sections, and the structure will remain visible.
- You may save your progress at any time and return later to complete the questionnaire (depending on the survey platform you use).
- For responses requiring explanation, please feel free to provide as much detail as you consider relevant.
- Where possible, upload or reference guidelines, datasets, reports, or publications that can support the synthesizing work.



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Estimated time for completion

For one habitat: approximately 15-20 minutes.

For multiple habitats: 10 minutes per additional habitat, depending on the level of available information.

Most respondents completing only one habitat will finish in under 20 minutes.

Contact

In case you would like to reach out to the technical team please write us at: lifemapper@ismar.cnr.it or Simonetta Frascchetti simonetta.frascchetti@unina.it

GDPR & Data Protection Disclaimer

In accordance with Regulation (EU) 2016/679 (General Data Protection Regulation – GDPR), we inform you that:

The questionnaire collects only the minimum personal data necessary (e.g., affiliation, professional role, email address if you choose to provide it for follow-up). All personal data will be processed lawfully, fairly, and transparently, solely for the purposes of the LIFE-MAPPER project (<https://www.life-mapper.eu/>). Your data will be stored securely and accessed only by authorised members of the LIFE MAPPER consortium. Data will not be shared with third parties outside the project nor used for any commercial purpose. You may request access, rectification, or deletion of your personal data at any time by contacting the project team. Participation is voluntary, and you may withdraw at any moment without any consequences. Responses used in reports, analyses, and publications will be aggregated or anonymised, ensuring that no individual respondent can be identified.

By proceeding with the questionnaire, you confirm that you have been informed about how your data will be processed in accordance with GDPR.

Expert survey overview

A total of 63 expert questionnaires were completed through the EU Survey platform. Respondents represented research institutions, national authorities, environmental agencies and other organisations, covering multiple European marine regions and possessing expertise in habitat mapping, condition assessment, conservation, restoration, monitoring and marine spatial planning.

The questionnaire was structured around four main themes:

1. Expert profile and expertise, including institutional affiliation, years of experience, geographical scope of activity and areas of specialisation.
2. Habitat condition assessment, addressing:
 - habitat occurrence and distribution,
 - existing condition assessment schemes,

- indicators currently in use,
 - monitoring protocols and frequencies,
 - availability of quantitative thresholds distinguishing good and poor condition.
3. Reference conditions and favourable reference areas, including the use of benchmark conditions, favourable reference values and criteria adopted for defining favourable reference areas.
 4. Restoration and implementation, focusing on ongoing or planned restoration activities, restoration approaches, implementation scales, cost assessment, methodological challenges, knowledge gaps and confidence levels associated with expert responses.

The survey provides a unique knowledge base for evaluating the current availability of indicators, reference conditions and ecological thresholds across European marine habitats, helping to identify areas where expert knowledge remains essential to support harmonised assessments under the Nature Restoration Regulation.

It has been presented at the LIFE Marine Platform Meeting in Valencia on June 9, 2026. Find below a preliminary analysis of the results obtained from 63 questionnaires.

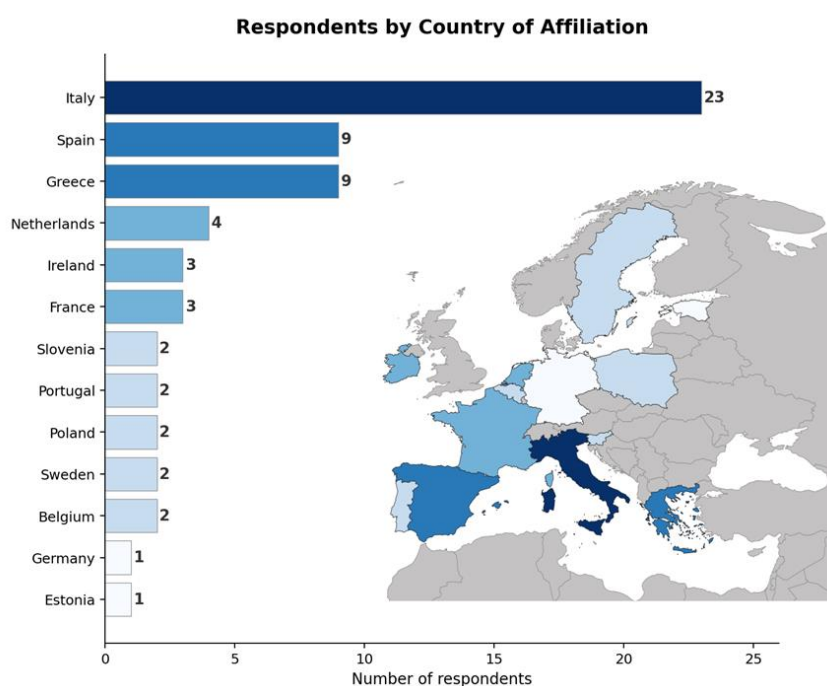


Figure 1. Geographic distribution of respondents by country of affiliation.

Respondents come from 13 European countries. Italy is by far the most represented country (23 out of 63 respondents), followed by Spain and Greece (9 each). This distribution reflects

the strong Mediterranean participation within the LIFE MAPPER consortium and the lower contribution from Northern European countries.

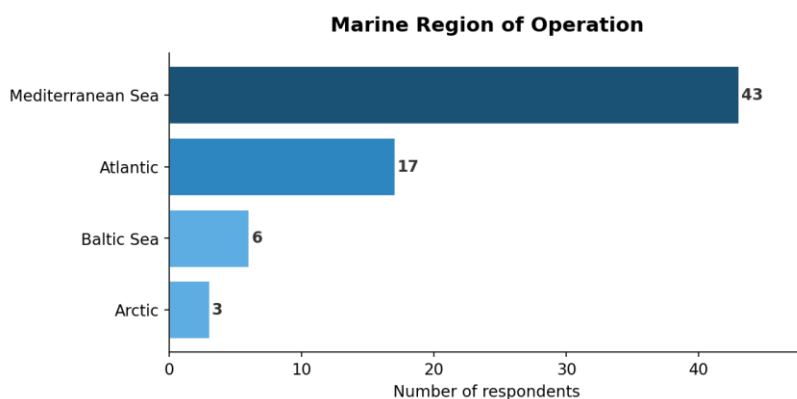


Figure 2. Marine region of operation of respondents.

The Mediterranean Sea accounts for the majority of responses (43), followed by the Atlantic (17); the Baltic Sea (6) and the Arctic (3) are less represented. This imbalance is consistent with the geographic distribution of respondents.

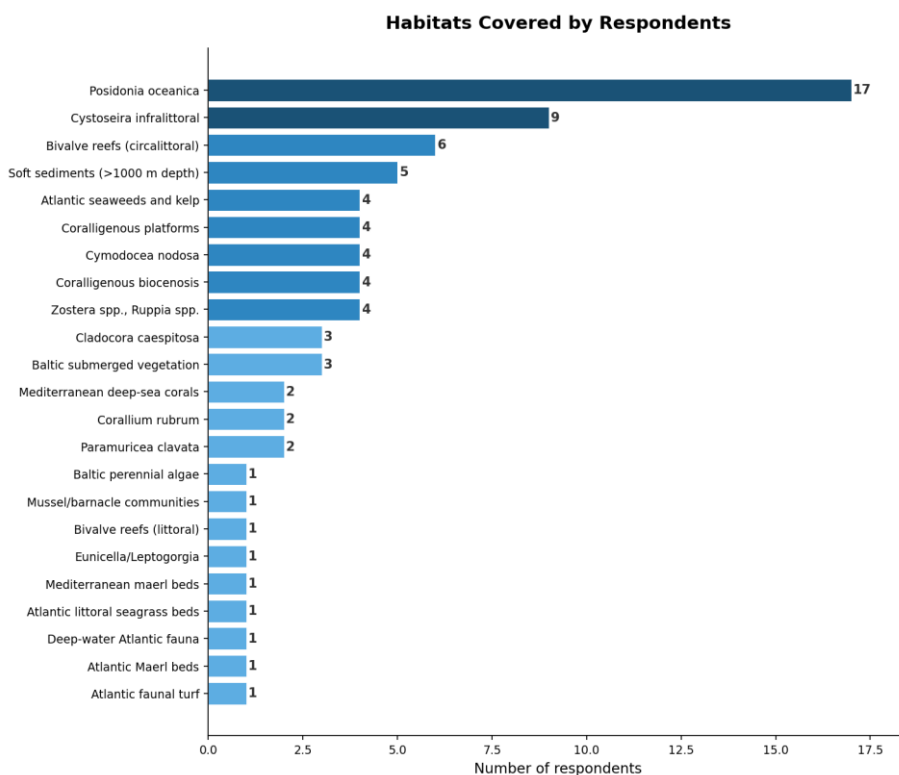


Figure 3. Habitats covered by respondents.

Posidonia oceanica is the most covered habitat (17 respondents), followed by infralittoral *Cystoseira* (9) and circalittoral bivalve reefs (6). Many other Mediterranean, Atlantic and Baltic habitats are represented by a smaller number of experts (1-4 respondents each).

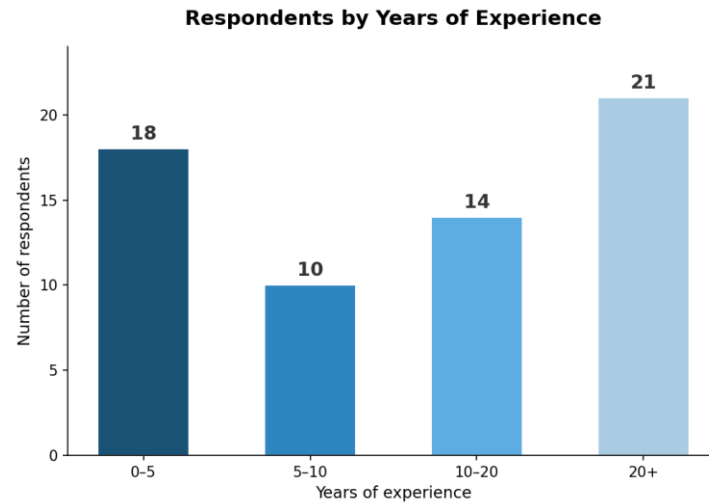


Figure 4. Respondents by years of professional experience.

The Figure 4 shows a good spread along the experience gradient: 21 respondents have more than 20 years of experience and 18 have fewer than 5, highlighting the prevalence of senior and early-career profiles.

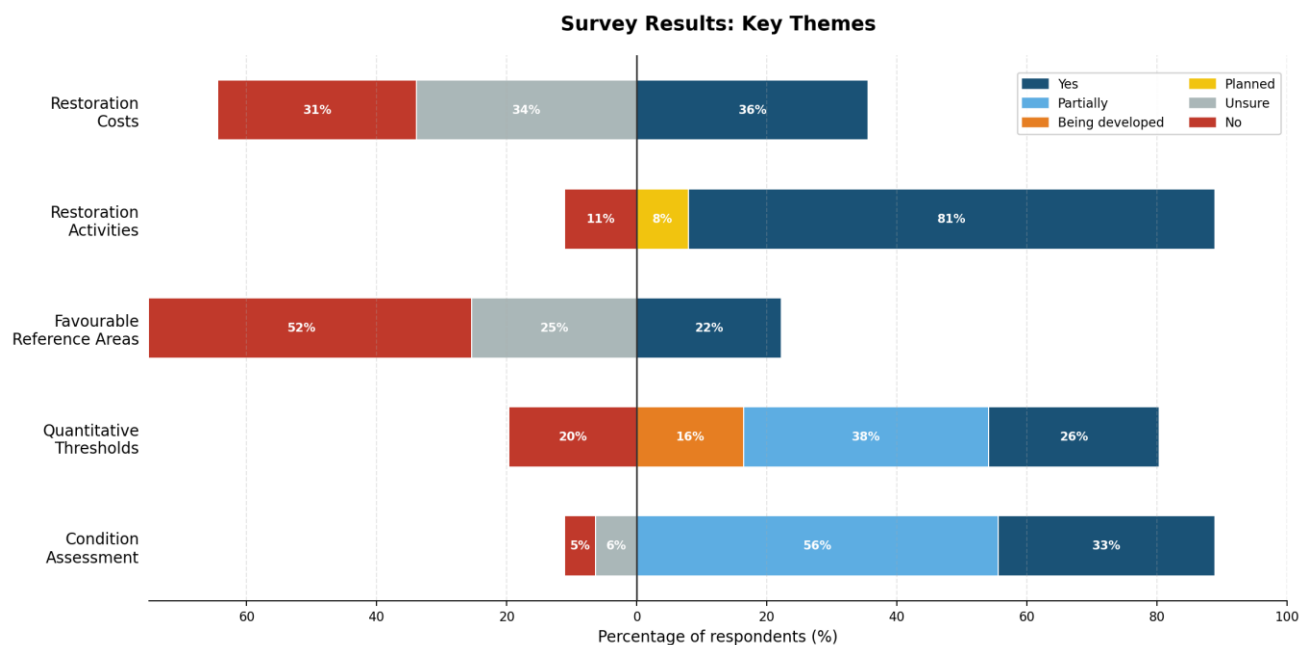


Figure 5. Survey results on key themes (diverging bar chart).

The diverging bar chart summarizes expert responses across five key thematic areas. For Condition Assessment, a very large proportion of respondents confirmed that condition assessment is still partially or absent. Quantitative thresholds defining “good ecological status” are often lacking, as well as the identification of Favorable Reference Areas meaning that FRAs are not yet defined for most of the habitats covered by this survey. Despite these gaps, 81% of respondents confirmed that Restoration Activities have been done, are ongoing or planned. In addition, restoration costs are not always assessed.

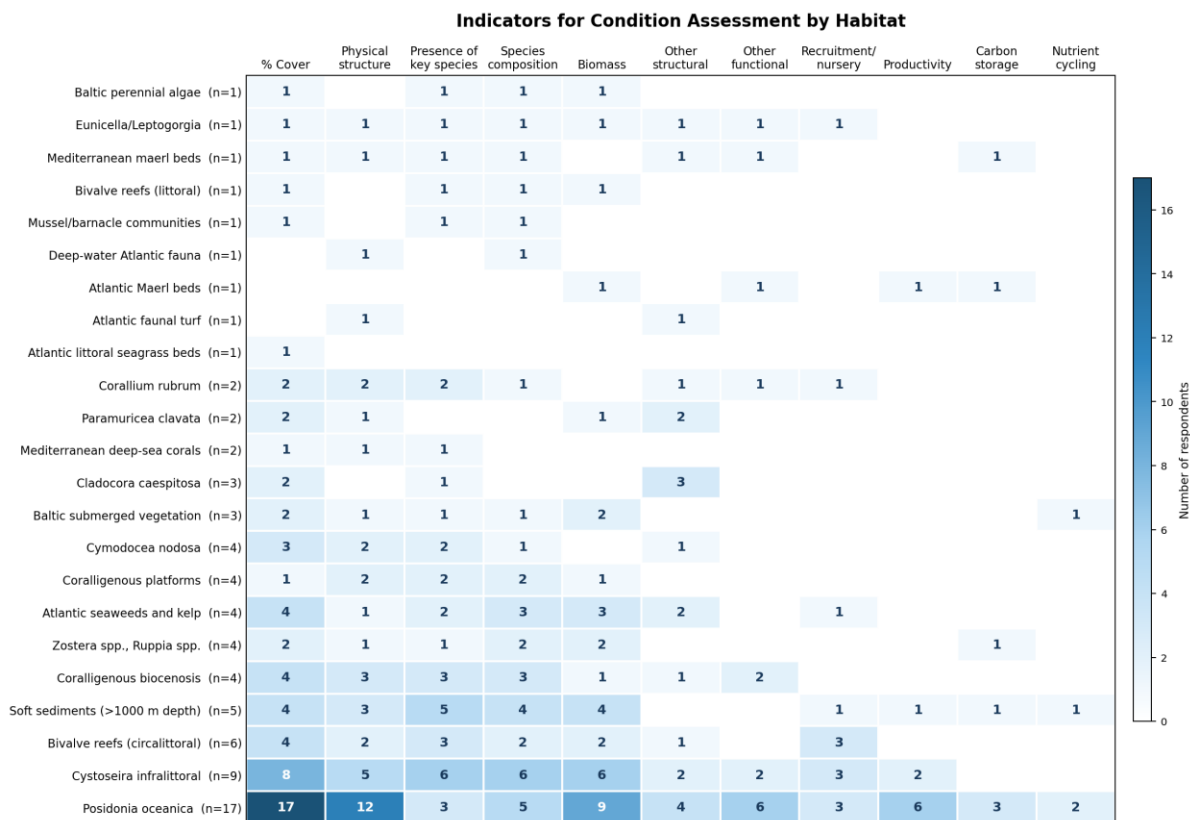


Figure 6. Indicators used for condition assessment, by habitat.

The heatmap shows that % Cover and Physical structure are the most widely used indicators, particularly for *P. oceanica*. Functional indicators (productivity, carbon storage, nutrient cycling) are instead used by only a limited number of experts and mainly for a few key habitats. However, even for habitats such as *P. oceanica*, for which condition assessment indicators are relatively well established, the indicators currently in use remain heterogeneous across monitoring and assessment frameworks, highlighting the need for greater harmonization and standardization.

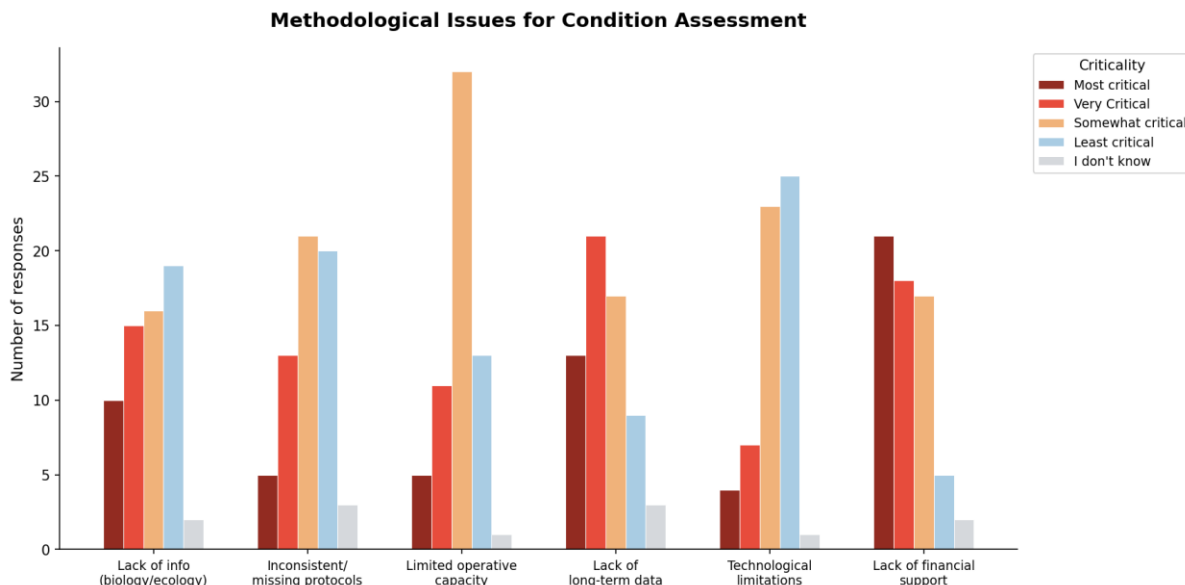


Figure 7. Perceived methodological issues for habitat condition assessment.

Lack of financial support is identified as the single most critical issue overall, followed by lack of long-term data and limited operative capacity. In contrast, technological limitations were perceived as relatively less critical, suggesting that suitable restoration technologies are generally available, while insufficient financial resources remain the primary barrier to their implementation.



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Mapping and condition assessment gaps of marine habitats

Ute Jacob (Bioagora): Questionnaire on thresholds and conditions

A parallel initiative has been carried out by BioAgora. At the LIFE MAPPER Restoration workshop held in Bologna on 11-12th December 2025, Ute Jacob addressed key conceptual challenges in applying the Nature Restoration Regulation, focusing on definitions of habitat condition, benchmarks, and favourable reference areas. It was highlighted that the Regulation does not provide an explicit operational definition of some key concepts, making it necessary to interpret and apply them consistently when selecting indicators and metrics to assess habitat condition and restoration progress.

Concerns were raised about potential misinterpretation of “minimum” thresholds, but it was clarified that definitions are fixed in the Regulation and that implementation should focus on selecting appropriate measures, justifying them, and monitoring their effectiveness rather than on semantic distinctions. In Bologna, the discussion highlighted the importance of shared understanding and documentation of early implementation experiences to support coherent application of the Regulation over time.

After the meeting, we decided to capitalize on the BioAgora effort and to create a link between the two initiatives so that results will be discussed together.