

Requirements for effective monitoring of the Portuguese Network of Marine Protected Areas

João Garcia Rodrigues, Tomás Fernandes Pinheiro, Ana Sofia Lavrador, Isabel Sousa Pinto, Marina Dolbeth, Francisco Arenas, Mafalda Correia

CIIMAR/CIMAR LA, Interdisciplinary Centre of Marine and Environmental Research, University of Porto

Executive summary

Without effective monitoring, the future Portuguese Network of Marine Protected Areas (RNAMP) risks becoming a “paper network”, failing to protect marine biodiversity at a critical time for Portugal’s ocean governance. This policy brief presents recommendations for developing a coherent, cost-effective, and scientifically robust monitoring programme for RNAMP.

Main findings

- Only 40 of Portugal’s 117 marine protected areas (MPAs) are currently covered by management plans;
- There are accessible national monitoring plans or programmes specifically dedicated to MPAs.
- Some monitoring activities are done through research projects or regional programmes, but these are not part of any coordinated plan for MPAs.
- There are no accessible repositories for MPA monitoring data.
- Monitoring responsibilities are divided among several entities, resulting in fragmentation and inefficiency.

Policy recommendations

- Establish coordination structure for RNAMP;
- Define clear and measurable objectives for the network;
- Develop a national monitoring strategy;
- Secure stable and sufficient staff, equipment and resources.

Recipients of the policy brief

National Government (Ministry of the Environment and Energy, Ministry of Agriculture and Sea), Regional Governments of the Açores and Madeira, DGPM, ICNF, DGRM, DRPM Açores, IFCN Madeira, DRAM Madeira.

Introduction and Problem

What is RNAMP?

The Portuguese Network of Marine Protected Areas (RNAMP), proposed in the Council of Ministers Resolution 143/2019 of 29 August, encompasses 93 protected areas and aims to safeguard Portugal’s marine natural heritage.

RNAMP includes coastal and oceanic marine protected areas (MPAs) located on the mainland, in the Açores and Madeira archipelagos, and on the continental shelf beyond 200 nautical miles (Figure 1). The network was designed to ensure representative

coverage of marine ecosystems in Portugal and to promote effective and equitable protection regimes coordinated across different spatial scales.

Why is RNAMP important?

RNAMP can enhance marine conservation through a **network effect**¹, whereby the combined benefits of the network exceed the sum of the benefits of individual MPAs.

To achieve this, the network must meet criteria of **representativeness**, **replication** and **ecological connectivity**¹⁻³, supported by strong governance, clearly defined responsibilities, inclusive stakeholders engagement, measurable objectives, and adequate resources⁴⁻⁶.

Its effectiveness depends on **adaptive and coordinated management**, where measures are adjusted over time based on performance evaluations. Monitoring is fundamental to enabling such adaptive management⁷⁻⁸.

The monitoring challenge

Despite its importance, MPA monitoring in Portugal remains limited or, in some cases, non-existent. The main causes are weak planning, uncoordinated efforts, poorly designed indicators, short-term initiatives, and insufficient resources⁹.

As a result, biodiversity data from MPAs are scattered, incomplete, and often inaccessible. This lack of data makes it **impossible to assess the effectiveness of MPAs in Portugal**. Overcoming these challenges demand a coordinated monitoring framework capable of generating reliable data to guide the adaptive management of RNAMP.

The INDIMAR project

To address these national challenges, the INDIMAR project defined key requirements for effective monitoring of RNAMP.

A working group of 36 experts – comprising MPA researchers, representatives of public institutions with marine conservation mandates, and environmental NGOs – was established to assess Portugal's MPA monitoring landscape and propose actionable recommendations.

Figure 1. Marine protected areas (MPAs) in Portugal. In 2025, there were 117 MPAs nationwide.



Key Findings

The INDIMAR project assessed the current landscape of MPA monitoring in Portugal by reviewing planning documents, legal instruments, and research project reports (Figure 2). This analysis, complemented with a review of the scientific literature, informed three workshops that defined priority requirements and selected indicators for a monitoring programme for RNAMP.

Overview of MPA monitoring in Portugal

- Although **117 MPAs** have been designated in Portugal, only **40** are covered by **management plans** – a key prerequisite for monitoring;
- Of these, **23 MPA management plans** have been published, nine of which are over 15 years old. Several plans cover multiple MPAs;
- There are **no monitoring plans or programmes** specifically dedicated to MPAs;
- Some monitoring activities are conducted through research projects, scientific campaigns, and regional initiatives (e.g., the MARSW project, Madeira's marine biodiversity monitoring programme). These efforts are valuable but sporadic and generally **not integrated into management plans**;
- No central or publicly accessible **data repositories** exists for MPA monitoring, and there are no clear guidelines on data collection frequency or indicators use;
- **MPA monitoring responsibilities** are dispersed among multiple entities, with considerable differences between mainland Portugal, the Açores and Madeira, and the Extended Continental Shelf.

Capacity and limitations

The working group identified both strengths and weaknesses in Portugal's current MPA monitoring situation.

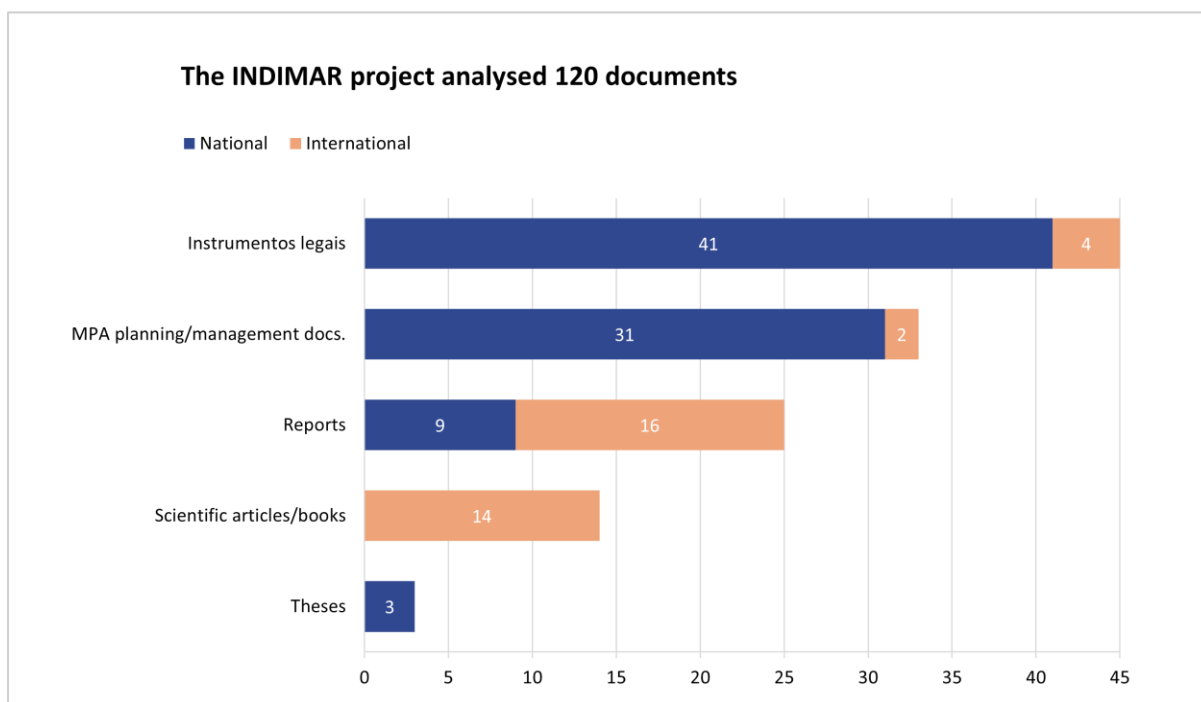
The main **positive aspects**:

- **Knowledge and capacity**: Portugal has a strong scientific and technical base for MPA monitoring within public management bodies and national research institutions;
- **Cooperation and participation**: there are positive examples of collaboration between entities and stakeholders, which facilitate information sharing and joint monitoring efforts;
- **Monitoring data**: some baseline information already exists, originating from research projects and monitoring campaigns;
- **Governance and management**: examples of successful co-management, such as octopus fisheries in the Algarve, offer valuable models for future MPA management and monitoring initiatives.

The main **negative aspects**:

- **Poor planning**: monitoring efforts are fragmented in time and space due to lack of strategic planning, prioritisation, and coordination among management entities and research centres;
- **Scattered and inaccessible data**: there is no integrated system for biophysical and socio-economic data, leaving information fragmented and difficult to access, even for public authorities;
- **Insufficient resources**: human, technical and financial resources remain inadequate, particularly within public authorities such as ICNF and DGRM. A lack of stable funding and guidance on how to distribute resources equitably across regions undermines the development of long-term monitoring programmes.

Figure 2. Number and type of documents analysed in the INDIMAR project to assess the MPA monitoring landscape in Portugal.



Policy Options and Recommendations

The **legal designation of RNAMP** is a crucial first step, but it does not guarantee the protection of marine biodiversity or the sustainability of human activities that depend on it. Ensuring that RNAMP functions well requires coordinated management and integration of effective measures across both the network and individual MPAs.

In this context, it is important to ask:

What are effective management measures for RNAMP?

To answer this question, management measures must be **evidence-based, operational, and regularly evaluated** to determine whether they are achieving RNAMP's objectives.

This requires the implementation of a **monitoring programme** capable of generating reliable data to assess performance and support adaptive management across the network.

The INDIMAR project has outlined a pathway to establish a coherent, cost-effective and

scientifically sound monitoring programme for RNAMP. This pathway involves **four operational steps**, which should be implemented in parallel, particularly Step 4, which underpins all others.

Step 1. Establish a dedicated coordination structure for RNAMP

To ensure RNAMP's effectiveness, a dedicated structure must be created to coordinate the management and monitoring of the MPAs across Portugal. At present, responsibilities are divided among several entities, often leading to overlapping activities, duplicated efforts, and inefficient use of resources. A coordinated structure should define common priorities, streamline communication, and ensure coherence in monitoring and management efforts.

In line with the Council of Ministers Resolution 143/2019 of 29 August, which foresees the creation of a body or commission, RNAMP would benefit from an institutional mechanism that reflects the diversity of entities involved in marine conservation and clearly defines their

roles and responsibilities in both management and monitoring.

Step 2. Define clear and measurable objectives for RNAMP

Clear, measurable objectives are essential for effective monitoring and evaluation. They align monitoring efforts with the desired outcomes and enable assessment of management measures across biophysical, social, and governance dimensions.

The 20 objectives currently defined for RNAMP in the Council of Ministers Resolution 143/2019 of 29 August lack clarity and operational detail. It is therefore recommended that they be reformulated as **SMART objectives** – specific, measurable, achievable, relevant and time-bound – to ensure they are actionable and assessable over time.

STEP 3. Develop a national monitoring strategy

Many of the challenges facing MPA monitoring in Portugal stem from the absence of a national strategy and limited baseline data describing initial biophysical and socio-economic conditions. Without this information, it is impossible to reliably assess changes in biodiversity or overall RNAMP performance.

A national monitoring strategy would organise efforts across the country, harmonising indicators, methods and data management protocols. This strategy should establish **baseline conditions** for all MPAs within RNAMP, drawing on existing data and commissioning new surveys where necessary.

The approach should operate on **two complementary scales**:

- **Local**: monitoring within individual MPAs;
- **Network**: assessing the collective performance of RNAMP as a whole.

The INDIMAR project has proposed a set of **55 key indicators** covering biophysical, social and governance aspects of monitoring. This can serve as a reference in developing the national monitoring strategy.

The indicators are available via [this link](#).

Step 4. Secure stable and sufficient resources

The success of RNAMP monitoring depends on the availability of predictable and adequate **staff, equipment and funding**. Currently, monitoring is constrained by over-reliance on short-term projects, a shortage of dedicated teams, and a lack of stable financing, factors that render many MPAs ineffective in practice.

To overcome these barriers, a **stable and programmed public funding model** is needed, complemented (but not replaced) by additional sources. It is also essential to strengthen staffing levels, provide technical capacity, and guarantee long-term financial security. Sustained investment in these areas is indispensable to ensure continuity, consistency, and quality in RNAMP monitoring.

A roadmap for monitoring

A total of **15 actions** are planned for implementation between **2026 and 2030**, ranging from the establishment of RNAMP's coordination structure to the approval of the national monitoring programme.

These actions are detailed in the *Roadmap for Monitoring the Portuguese Network of Marine Protected Areas 2030*, via [this link](#).

References

1. Grorud-Colvert, K. *et al.* Marine Protected Area Networks: Assessing Whether the Whole Is Greater than the Sum of Its Parts. *PLoS ONE* 9, e102298 (2014).
2. IUCN-WCPA. Establishing Marine Protected Area Networks—Making It Happen., IUCN-WCPA, National Oceanic and Atmospheric Administration and The Nature Conservancy, Washington, D.C (2008).
3. Cristiani, J. *et al.* Quantifying marine larval dispersal to assess MPA network connectivity and inform future national and transboundary planning efforts. *Canadian Journal of Fisheries and Aquatic Sciences*, 81(6), 670-686 (2024).
4. Gleason, M. *et al.* Designing a network of marine protected areas in California: Achievements, costs, lessons learned, and challenges ahead. *Ocean & Coastal Management* 74, 90–101 (2013).
5. Rees, S. E. *et al.* Bridging the divide: Social–ecological coherence in Marine Protected Area network design. *Aquatic Conservation* 28, 754–763 (2018).

6. Beaty, F. *et al.* From design to implementation: Lessons from planning the first marine protected area network in Canada. *Marine Policy* 170, 106360 (2024).

7. Marine Protected Area Networks in California, USA. in *Advances in Marine Biology* 205–251 (Elsevier, 2014).

8. Smith, J. G. *et al.* Conservation benefits of a large marine protected area network that spans multiple ecosystems. *Conservation Biology* e14435 (2025)

9. Horta e Costa, B. MPA X-ray-Diagnóstico das Áreas Marinhas Protegidas Portuguesas. 2ª edição incluindo contributos e comentários dos vários stakeholders. WWF Portugal. Portugal, 80pp (2017).

HOW TO CITE THIS DOCUMENT

Garcia Rodrigues, J., Pinheiro, T.F., Lavrador, A.S., Sousa Pinto, I., Dolbeth, M., Arenas, F., Correia, M., (2026). *Requirements for effective monitoring of the Portuguese Network of Marine Protected Areas*. S4P-23 Policy Brief 5601/2023. PLANAPP – Centro de Planeamento e de Avaliação de Políticas Públicas.

CONTACT

science4policy@planapp.gov.pt

COPYRIGHT

© PLANAPP, 2026

 [Ciência para as políticas públicas](#)

 [PLANAPP](#)

 [Newsletter](#)

 [PLANAPP](#)

 [@planapp_](#)

 [PLANAPP podcasts](#)



This policy brief was developed under the Science4Policy 2023 (S4P-23): annual science for policy project calls, an initiative by the Centre for Planning and Evaluation of Public Policies (PLANAPP) in partnership with the Foundation for Science and Technology (FCT), financed by Portugal's Recovery and Resilience Plan. Thematic line S4P-23/20: Climate change and resource sustainability / Integrated indicators for marine and coastal biodiversity.

The content is the sole responsibility of its authors and does not bind or commit PLANAPP nor FCT.