



Policy brief

Marine and Coastal Ecosystem Restoration under the Nature Restoration Regulation

A Roadmap Approach for National Implementation

Key NRR Articles

- **4: Terrestrial, Coastal and Freshwater Ecosystems**
- **5: Marine Ecosystems**
- **18: Coordinating Restoration in Marine Ecosystems**
- **14: Preparation of NRPs**
- **15: Content of NRPs**
- **20: Monitoring**
- **21: Reporting**

Key Messages

- Limited resources can constrain marine restoration efforts; **spatial biodiversity risk assessments can help prioritise restoration areas and measures in National Restoration Plans (NRPs)**, see [recommendation 1](#).
- Climate change may undermine restoration success; **national authorities could incorporate climate resilience into restoration planning and design**, see [recommendation 2](#).
- Inconsistent monitoring limits comparability; **Member States are encouraged adopt standardised frameworks for NRP implementation and reporting**, see [recommendation 3](#).
- Disease and invasive species can undermine marine and coastal restoration; **national authorities could integrate biosecurity and risk assessments into restoration planning**, see [recommendation 4](#).
- Marine restoration often involves trade-offs with human activities; **socio-ecological assessments can inform measure selection and design**, see [recommendation 5](#).
- Differences in restoration methodologies can hinder knowledge transfer between projects; **marine restoration toolboxes can help standardise implementation and evaluation**, see [recommendation 6](#).
- Fragmented governance creates barriers to restoration; **Member States can strengthen coordination across authorities and sectors to support implementation**, see [recommendation 7](#).



Introduction: How can this brief help you?

The **EU Nature Restoration Regulation (NRR)** requires Member States to implement measures that support the recovery of coastal ecosystems (**Article 4**) and marine ecosystems (**Article 5**) including where implementation involves measures under the Common Fisheries Policy (**Article 18**), and fulfil monitoring and reporting obligations (**Articles 20** and **21**). These requirements involves practical challenges related to restoration prioritisation, climate and biological risks, monitoring, socio-ecological trade-offs, and cross-sector coordination.

This brief provides recommendations for national authorities, marine planners, and protected area managers to support NRP preparation and implementation. It forms

part of a series of four implementation briefs covering forest, freshwater, marine and coastal, and urban ecosystems. The recommendations are organised as a phased roadmap covering: i) NRP preparation, publication, and early implementation; ii) implementation of restoration objectives towards 2030; and iii) longer-term monitoring, reporting, and adaptive implementation beyond 2030.

Drawing on evidence from the BiodivRestore-funded projects [MPA4Sustainability](#), [RESTORESEAS](#), and [REMOVE DISEASE](#), this brief highlights practical implementation approaches to support marine restoration planning, delivery and long-term recovery.



Recommendations: A Roadmap Approach for NRP Preparation and Implementation

As illustrated in **Figure 1**, the recommendations are structured as a phased roadmap approach to support NRP preparation, implementation, and the delivery of restoration targets over time. The following recommendations are organised according to these implementation phases.

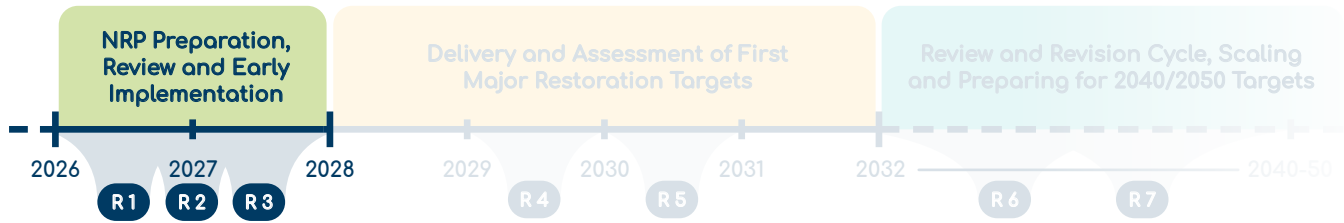


Figure 1 - Recommendations for the NRP Preparation, Review and Early Implementation phase

NRP Preparation, Review and Early Implementation (0-2 years / 2026 – 2028)

Recommendation 1: Utilise Spatial Risk Mapping to Prioritise Marine Restoration Areas

Articles 4, 5, and 14 require Member States to identify and describe restoration measures, quantify areas to be restored, and prepare NRPs setting out how restoration objectives and targets will be achieved.

National authorities could incorporate spatial risk assessments that combine ecological condition, human activities, and species sensitivity when prioritising restoration areas and marine management measures.

Case Study 1: Using Spatial Risk Assessments to Support Restoration Prioritisation
 MPA4Sustainability developed the [MPA Management Explorer](#), a decision-support platform that assesses cumulative biodiversity risks across ~17,000 MPAs by combining human pressures with species vulnerability data. The tool enables users to compare MPAs, identify key ecological pressures, and explore how management measures may affect cumulative risk, supporting restoration prioritisation and evidence-based marine spatial planning.



Image: Kelp Forest

Recommendation 2: Integrate Climate Resilience into Marine Restoration Design

NRR Article 15 requires Member States to also consider climate change scenarios and climate adaptation when planning restoration measures within NRPs.

National authorities could incorporate climate resilience criteria into restoration site selection and project design to help ensure restoration investments remain effective under future environmental conditions.

Case Study 2: Planning Climate-Resilient Marine Restoration
 RESTORESEAS assessed how climate change may affect the future suitability of marine restoration sites and source populations across seagrass, macroalgal, and coral ecosystems. The project showed that populations differ in their tolerance to environmental change, highlighted the importance of genetic diversity for long-term restoration success, and identified areas that may become less suitable for restoration under future climate conditions.

Recommendation 3: Establish Standardised Monitoring and Reporting Frameworks to track Restoration Progress

NRR Articles 20 and 21 require Member States to monitor restoration progress and report on ecosystem trends.

National authorities can promote consistent monitoring frameworks across restoration projects to strengthen reporting, support adaptive management, and improve the comparability of restoration outcomes over time.

Case Study 3: Using Standardised Monitoring to Track Marine Restoration Outcomes
 MPA4Sustainability demonstrated how environmental DNA (eDNA) can detect species and ecosystem changes across large spatial scales, complementing conventional biodiversity surveys. The project also explored how bio-diversity indicators, ecosystem service assessments, and socio-ecological data can be combined to support adaptive management and the evaluation of restoration



Figure 2 - Recommendations for the Delivery and Assessment of First Major Restoration Targets phase

Delivery and Assessment of First Major Restoration Targets (2-6 years / 2028 – 2032)

Recommendation 4: Integrate Disease and Biosecurity Risks into Restoration Planning

NRR Article 15 requires Member States to describe the measures that will be used to achieve restoration objectives and the factors that may influence their effectiveness.

National authorities may want to proactively incorporate disease and biosecurity considerations into restoration planning and implementation to help reduce risks to long-term restoration effectiveness and success.

Case Study 4: Managing Disease and Biosecurity Risks in Restoration Programmes
 Disease outbreaks and invasive species can affect restoration outcomes by reducing survival, slowing recovery, or increasing vulnerability to other pressures. REMOVE_DISEASE examined interactions between pathogen transmission, host populations, and invasive mammals in island ecosystems and seabird restoration programmes. The project showed how disease outbreaks and invasive species can affect survival, population recovery, and vulnerability to other environmental pressures, demonstrating that biological pressures often interact rather than acting independently.

Recommendation 5: Integrate Socio-Ecological Assessments into Marine Restoration Planning

NRR Article 14 requires Member States to identify and describe the restoration measures needed to contribute to the fulfilment of the restoration objectives and targets set out in **Articles 4** and **5**.

National authorities could incorporate socio-ecological assessments into restoration planning to help identify potential trade-offs, evaluate alternative management options, and support restoration measures that are effective under real-world environmental and social conditions.

Case Study 5: Integrating Ecological and Human Pressures into Marine Restoration Planning
 At the Cerbère-Banyuls Marine Nature Reserve in France, MPA4Sustainability developed modelling approaches to assess ecological objectives and human activities together in marine management decisions. The project examined how alternative protection-zone configurations could affect fish populations and explored the use of online data to anticipate visitor pressures, helping evaluate trade-offs





Figure 3 - Recommendations for the Review and Revision Cycle, Scaling and Preparing for 2040/2050 Targets phase

Review and Revision Cycle, Scaling and Preparing for 2040/2050 Targets (6+ years / 2032 Onwards)

Recommendation 6: Develop a National Marine Restoration Toolbox

NRR Articles 5 and 14 require Member States to identify, plan, and implement restoration measures to achieve marine ecosystem restoration objectives and targets.

National authorities could establish a national marine restoration toolbox that consolidates restoration protocols, technical guidance, and decision-support resources to support more consistent implementation of restoration measures and facilitate knowledge exchange across restoration programmes.

Case Study 6: Operational Guidance for Marine Restoration
 RESTORESEAS evaluated factors influencing marine habitat restoration and translocation across multiple Atlantic contexts. By combining habitat suitability assessments, genetic analyses, and restoration experiments, the project identified approaches to improve restoration outcomes and demonstrated how restoration knowledge can be transferred across sites and species.

Recommendation 7: Strengthen Coordination across Marine Restoration Policies and Authorities

NRR Article 18 establishes procedures for coordinating restoration measures in marine ecosystems where implementation involves conservation measures adopted under the Common Fisheries Policy.

National authorities could strengthen cross-sector coordination and information-sharing processes between fisheries, marine conservation, and marine spatial planning authorities to improve alignment between restoration planning, marine management, and related policy objectives.

Case Study 7: Identifying Coordination Challenges in the Øresund
 MPA4Sustainability examined how Denmark and Sweden implement legislation on fisheries, hunting, marine traffic, and biodiversity management in the transboundary Øresund region. The project identified differences in legal frameworks and management arrangements that can complicate coordination across a shared marine ecosystem, highlighting the importance of cross-border cooperation for coherent restoration planning and implementation.

Link to sources

[MPA4Sustainability](#)
[REMOVE_DISEASE](#)
[RESTORESEAS](#)

Scientific publications used in this policy brief can be found in the Information Sheet of this briefing downloadable from: www.biodiversa.eu/policy-briefs

Photos:
 pg 1 (header) - Laesoe Island, Denmark 2017, by torstengrieger via iStock
 pg 2 - Kelp forest, Location Unknown 2012, by Shur.ca via iStock
 pg 3 - Artificial Reefs, North Sea 2020, by Blauwind via De Rijke Noordzee

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About this Policy Brief

This Policy Brief is part of a series aiming to inform policymakers involved in the implementation of the Nature Restoration Regulation with policy recommendations based on the results of the BiodivRestore funded projects.

The series of Biodiversa+ Policy briefs can be found at www.biodiversa.eu/policy-briefs/.

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