ARTEMIS | Interreg Euro-MED

Co-funded by the European Union

Investment Opportunities in **Seagrass Restoration**

October 2025

ecoacsa

EY denkstatt
Sustainability Services

Team:

David Álvarez, Álvaro García,
Paula Castillo Alonso (Ecoacsa)

Ivan Paspaldzhiev, Martin Georgiev,
Denitza Pavlova
(EY Denkstatt)

Contributors & Reviewers

Arnaud Terrisse, Alice Wittevrongel
(Plan Bleu)

Ioli Christopolou, Dimitra Syrou
(The Green Tank)

About us:

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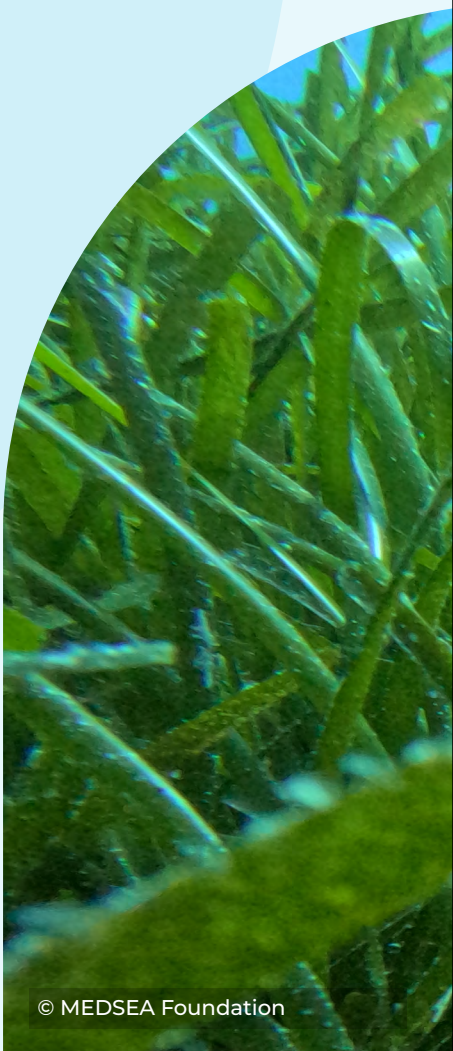
EY denkstatt

This report is based on the version:

State of the Art Report on Market Based Instruments for Boosting Seagrass Restoration and Conservation in the Mediterranean

By Ecoacsa and EY Denkstatt
December 2024



Forefront

Beyond Sustainability: Investing in the Engine of Mediterranean Prosperity

> “This report outlines the strategic case for investing in seagrass restoration.

The health of the Mediterranean Sea is inextricably linked to its economic vitality. Within this critical blue economy, seagrass meadows, particularly the ones of the endemic species *Posidonia oceanica*, function as essential natural assets. They underpin coastal economies and provide vital buffers against climate change, yet they face unprecedented threats from human pressures. This situation presents not merely an environmental challenge, but an emergent investment opportunity.

To address these opportunities, nature needs more sources of funding; likewise, we will miss the chance to achieve Kunming-Montreal Global Biodiversity Framework (KM GBF) and its goals. Therefore, we are at a pivotal moment, transitioning beyond traditional grant-based driven conservation funding, either by governments or philanthropy towards developing genuinely bankable, nature-positive projects willing to meet businesses and investors’ interest.

This report outlines the strategic case for investing in seagrass restoration. The Interreg Euro-MED ARTEMIS initiative, detailed herein, is pioneering the necessary frameworks to unlock the tangible financial value inherent in these ecosystems.

We are building the bridge between ecological restoration and financial return, offering investors a unique chance to participate in a nascent market that promises both a significant impact and long-term value.

Join us at the forefront of the Mediterranean blue finance innovation!

Executive summary

Mediterranean Seagrass: From Ecological Gem to Investable Asset Class

> “We invite you to explore this compelling proposition!

This report presents the investment case for Mediterranean seagrass restoration, a burgeoning frontier in natural capital markets.

- **The Mediterranean blue heart:** Accelerating seagrass restoration brings significant benefits not only to marine biodiversity, since Posidonia meadows provide habitat for numerous species, but also to humans by protecting coastlines from erosion, improving water quality, serving as nurseries for coastal fisheries, enhancing the aesthetic beauty of our oceans and coastlines, and contributing to the formation and extension of sand dunes.

- **The Untapped Opportunity:** Mediterranean’s iconic *Posidonia oceanica* seagrass meadows constitute vast, undervalued natural capital, essential for regional climate resilience and key industries like coastal tourism, insurance industries and fisheries.

- **Valuing Ocean Health:** Seagrass restoration offers pathways to tangible financial returns through structured financial mechanisms based on market-based tools. Key avenues include **Blue Carbon Credits** for climate mitigation, emerging **Biodiversity or Nature Credits** meeting corporate nature-positive goals (driven by KM GBF, EU Roadmap and other initiatives explained next), and **Payment for Ecosystem Services (PES)** schemes linking beneficiaries directly to positive verified outcomes in nature.

- **Favorable Market Tailwinds to create robust and credible demand:** Investment is underpinned by powerful global and regional drivers. The KM GBF (Target 19), the EU Green Deal, the new EU mandate for Nature Credits, the Corporate Sustainability Reporting Directive (CSRD), EU Taxonomy alignment, climate and nature resilience initiatives and evolving nature finance standards collectively creating robust demand and structure for credible nature-based investments.

- **The ARTEMIS Blueprint for Bankability:** The ARTEMIS project serves as a crucial incubator, developing investable restoration models across key Mediterranean sites. It integrates rigorous science combined with the United Nations-backed System of Environmental Economic Account - Ecosystem Accounting (UN SEEA – EA) framework and credible Monitoring, Reporting, and Verification (MRV) systems, building the investor confidence necessary for market growth.

Your Entry Point:
Investing in Mediterranean seagrass offers a strategic opportunity to achieve financial returns, mitigate portfolio risk, assured financial nature assess, meet critical Environmental Social and Governance (ESG) mandates, and secure early-move advantage in the rapidly expanding blue economy.

Index

1 The ARTEMIS framework

> “The ARTEMIS project strategically leverages four distinct Mediterranean locations to develop and validate robust restoration and financing approaches.

The **Interreg Euro-MED ARTEMIS** project aims to **accelerate the Restoration of Seagrass Meadows in the Mediterranean** area through **innovative ecosystem-service based Solutions**. Project partners include Plan Bleu, Hellenic Centre for Marine Research, Istituto Superiore per la Ricerca et la Protezione Ambientale (ISPRA), Mediterranean Coast and Sea Foundation (MEDSEA), Minorcan Institute of Studies – Socio-environmental Observatory of Menorca (IME-OBSAM), Municipality of Monfalcone, ECOACSA, EY Denkstatt, Bax, and the Green Tank.

The ARTEMIS project strategically leverages four distinct Mediterranean locations to develop and validate robust restoration and financing approaches. These pilots serve as real-world laboratories generating critical data on costs, success factors, stakeholder engagement, and measurable outcomes needed to structure credible investments.

- **Menorca, Spain (Cala Blanca): Restoring from Direct Impact:** Testing active restoration after infrastructure impact; developing PES links to coastal users. Demonstrates targeted recovery potential.
- **Sardinia, Italy (Capo Testa Punta Falcone MPA): Balancing Conservation and Use:** Combining passive (anchoring removal) and active restoration in an MPA; developing PES models linked to yachting/tourism fees. Quantifying carbon/biodiversity uplift in a protected area.
- **Crete, Greece (Atzikiari Bay, Natura 2000): Recovery in a Protected Area:** Investigating restoration after fish farm impacts within Natura 2000; linking restoration to fisheries and biodiversity goals. Exploring carbon/biodiversity co-benefits.
- **Monfalcone, Italy (Gulf of Trieste): Addressing Complex Industrial Settings:** Applying lessons to mixed seagrasses near a port; exploring links to port operations, shipping (Blue Carbon+), and industrial mitigation needs.

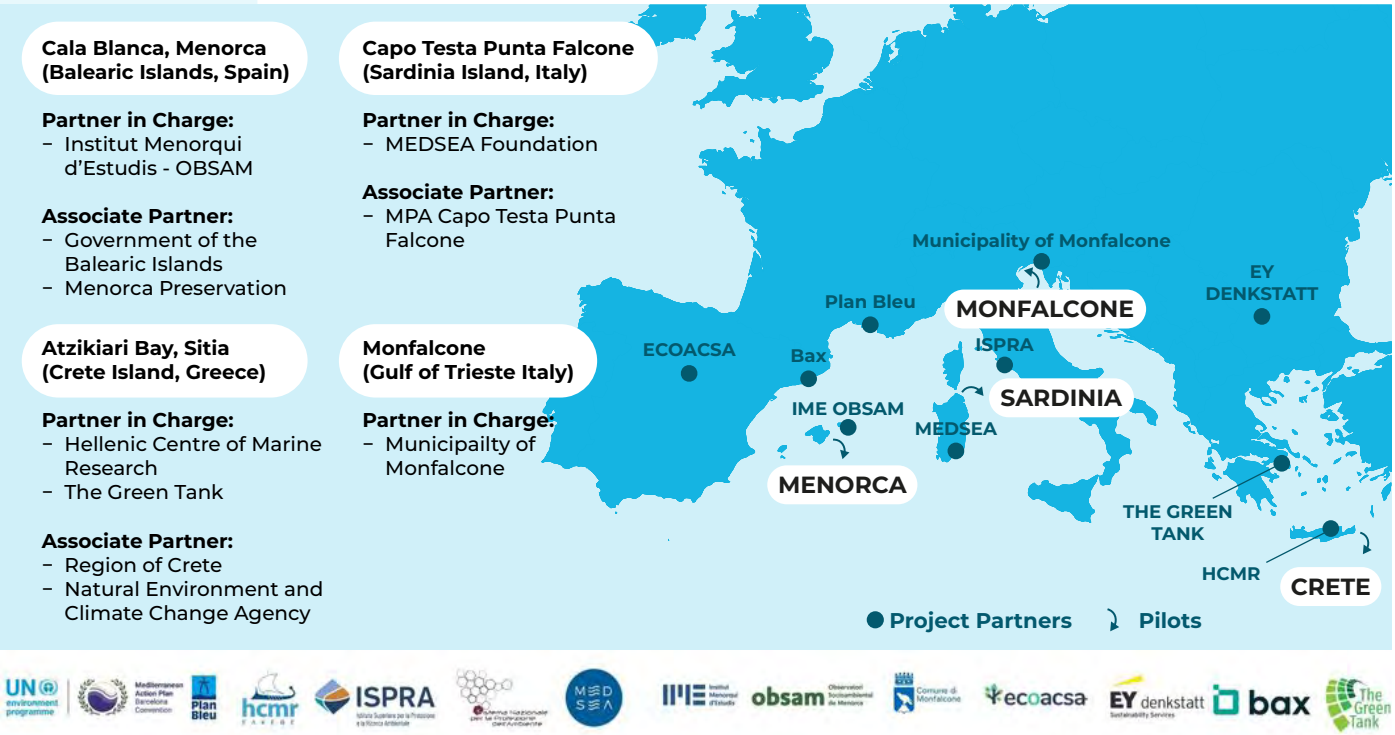


Figure 1 - ARTEMIS map of Pilot sites

2 The Mediterranean's Blue Heart: Seagrass as Blue Financial Infrastructure

Posidonia oceanica: The Blue Natural Infrastructure Powering Coastal Economies

Posidonia oceanica is a marine plant - not an algae- meaning it has roots, stems, leaves, fruits and flowers. It forms meadows between the surface and a depth of 40 metres. *Posidonia oceanica* is an endemic seagrass species of the Mediterranean Sea, which creates extensive meadows occupying a surface area of approximately 35 000 km2[1].

These underwater plants constitute an ecosystem of great beauty, whose contribution to the good environmental status of the Mediterranean Sea, and consequently, the Mediterranean economy is vital. According to the French Court, *€ 86,000 per hectare/year is the value of the ecosystem services provided by Posidonia oceanica*[2]. Other studies show that seagrass are valued at €5,57 trillion annually[3]. Awareness of this value shall reinforce and encourage the value of conserving and restoring marine meadows.

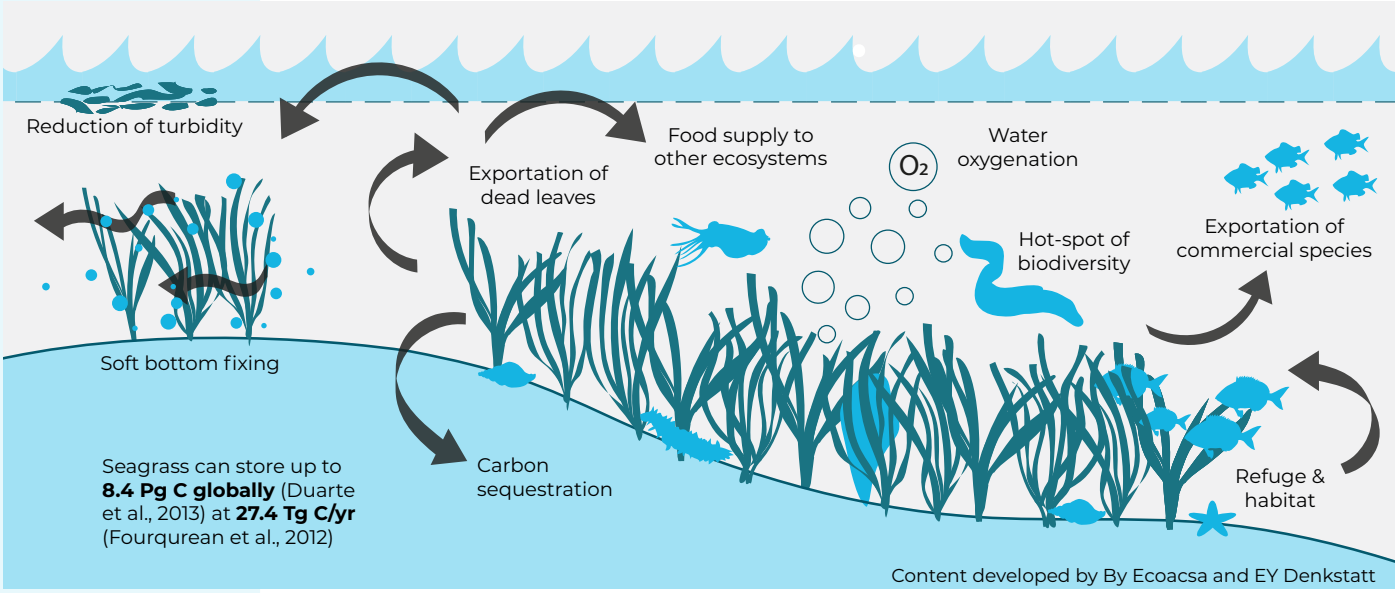


Figure 2 - Seagrass Meadows' Ecosystem Services, Source: Own elaboration

- **Climate Regulation & Carbon Markets:** Functioning as highly efficient **Blue Carbon Sinks**, these meadows capture and store significant amounts of atmospheric carbon. Restoration directly contributes to climate mitigation goals and generates potential revenue streams through verified **carbon credits**.[4]
- **Coastal Defense & Risk Reduction:** Acts as a natural **breakwater**, dampening wave energy, stabilizing the seabed, protecting coastal infrastructure, reducing erosion, and lowering insurance risks – offering substantial avoided costs.[5]
- **Biodiversity & Economic Engine:** Critical **nurseries and habitats** supporting commercial fisheries and underpinning the appeal of coastal tourism. This richness is the foundation for commercial fisheries to provide seafood and guarantee long term good condition ecosystems as the bases for touristic activities.[6]
- **Water Quality Maintenance:** Trapping sediments and filtering pollutants improve water clarity, benefiting tourism, recreation, and aquaculture operations.[6]

> **"According to a recent ruling from the French Court (2024), the value of the ecosystem services provided by *Posidonia oceanica* is €86,000 per hectare/year.**

[1]LIFE – Blue Natura, 2016; [2]WWF MMI, 2025; [3]Duarte et al., 2025; [4]Conservation International et al., 2022; [5]UNEP, GRID-Arendal, & UNEP-WCMC, 2020); [6]UNEP, n.d

3 A Depleting Asset: The Financial Imperative for Investment

Investing in seagrass restoration is urgent. This section justifies 'Why the moment is now?' from the perspective of risks and market demand.

3.1 The Rising Tide of Risk: Why Seagrass Loss Impacts the Bottom Line

> "Investing in seagrass restoration transcends environmental stewardship and goes beyond CSR or philanthropy for companies.

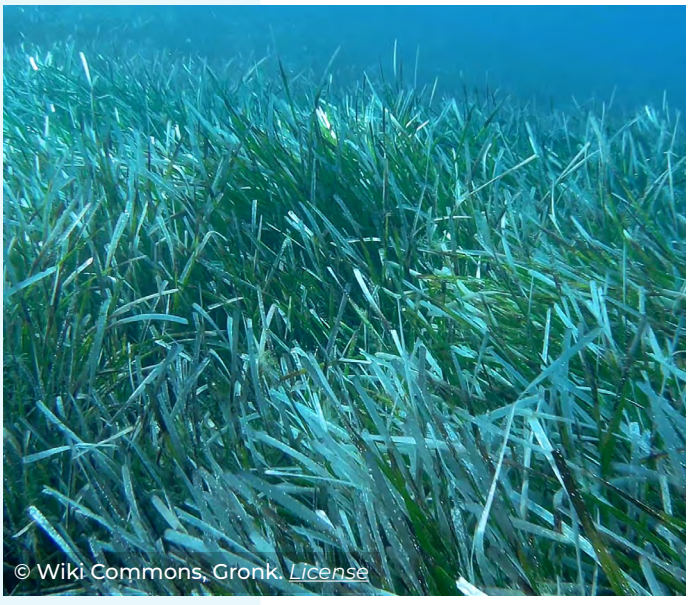
While the value proposition of healthy seagrass is clear, this critical asset is under severe threat. Globally, an alarming 7% of seagrass habitat is lost annually (UNEP, n.d)[6]. Mediterranean rates are worryingly high in many regions, driven by factors like coastal urbanization, pollution, unregulated[†] anchoring, destructive fishing (mainly trawling fisheries), and climate change impacts.

This degradation is not just an environmental tragedy; it represents a growing material financial risk. *Posidonia oceanica* meadows across the Mediterranean are experiencing significant decline, particularly in areas subject to intense human pressure.

The financial consequences of inaction are becoming increasingly apparent:

- Sand beaches quality and width decrease due to Posidonia surface reduction. This in turn might reduce tourism activity and affect coastal economies.
- Drastic reduction of nurseries promotion could result in fisheries collapse and these impacts could economically affect the seafood industry and food security and autonomy.
- Broader coastal vulnerability amplifies storm damage costs. Coastal protection costs for governments or insurance companies will be increased.
- Stricter regulation to meet KM GBF goals might cause some current activities (fisheries, recreational trawling, waste management...) to change and dramatically increase their operational costs becoming non-viable.
- Lost carbon storage potentially creates future liabilities.

Therefore, investing in seagrass restoration transcends environmental stewardship and goes beyond CSR or philanthropy for companies.



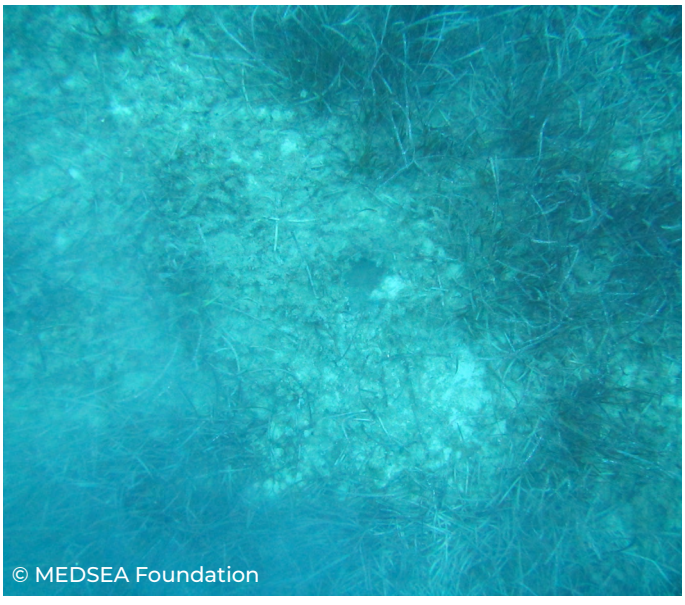


Figure 2 - Left - a thriving Posidonia meadow. Right - degraded, barren 'dead matte' seafloor

[†] Only France and the Balearic Islands have implemented and upheld rules to prohibit or at least control anchoring impact on *Posidonia oceanica*. [6] UNEP, n.d

3.2 Policy Tailwinds: Creating Market Demand and Structure

> “Public funds can act as de-risking capital to attract private co-investment in blended finance models.

Supportive policy and regulation are critical to market enablers. Globally, the **Kunming-Montreal Global Biodiversity Framework (GBF)** signals strong governmental commitment. KM GBF lays out concrete targets for 2030, including restoration of 30% of degraded ecosystems (Target 2), conservation of 30% of Lands, Waters and Seas (Target 3), and mobilization of $200 billion per year for Biodiversity (Target 19).

The European Union has pledged to allocate 10% of its budget in 2026 and 2027 to initiatives and investments aimed at protecting and restoring biodiversity. This commitment will be implemented through various financial instruments and programs. Additionally, the EU plans to double its funding for international biodiversity efforts, reaching €7 billion for the 2021–2027 period. These actions align with the GBF Target 19.

- The **EU Restoration Law** provides a unique legislation framework globally to restore at least 20% of the most relevant habitats in Europe by 2030.
- The **EU Nature Credits Roadmap** to boost private investment in nature-positive actions provides an appropriate institutional context for driving forward ocean restoration agendas.
- The **Corporate Sustainability Reporting Directive (CSRD)** mandates extensive disclosure on sustainability, including biodiversity impacts.
- The **Sustainable Finance Disclosure Regulation (SFDR)** requires financial players to disclose sustainability risks.
- The **EU Taxonomy for Sustainable Activities** provides a classification system incentivizing qualifying investments.

These policies collectively **create tangible demand** for verifiable nature-positive investments. Moreover, public funds can act as **de-risking capital** to attract **private co-investment** in blended finance models.

In February 2025, The European Commission introduced significant changes to the regulatory framework for sustainability reporting through the Omnibus package. One of the key proposed changes is the modification of the Corporate Sustainability Reporting Directive (CSRD), which will now primarily apply to larger companies with over 1,000 employees and specific revenue or asset thresholds. This adjustment is expected to significantly reduce the number of companies required to report, while still maintaining the essential requirement for double materiality analysis. Additionally, the number of reporting indicators will be streamlined to enhance practicality and ease of compliance.[7]

Market driven initiatives: Meeting Market Expectations, Initiatives & Standards Alignment.

Alongside regulatory drivers, voluntary market initiatives and sustainable standards play a key role in shaping corporate strategy and investor expectations, further building the case for seagrass investment. These are paving the way to help corporate and investors to better understand how nature may impact their investments.

- The **Taskforce on Nature-related Financial Disclosures (TNFD)** guides corporate reporting on nature risks/ opportunities.
- The **Global Reporting Initiative (GRI)** includes biodiversity reporting standards, and financial standards within the **International Sustainability Standards Board (ISSB)** is building a natural capital framework to gather financial consequences of nature inaction.
- Initiatives like the **Nature Positive Initiative** shape credible corporate action and metrics.

Alignment demonstrates proactive management of nature-related issues. This is why high-quality seagrass restoration methods must align naturally with globally recognized frameworks: Based on this, companies that will proactively develop strategies for mitigating these escalating natural financial risks would rebuild a resilient economy by creating valuable natural assets that secure long-term economic stability.

Overall, by positioning seagrass as a strategic **blue natural capital asset**, the Mediterranean region can attract substantial investment aligned with the above policy restoration goals.

[7] European Commission, 2025

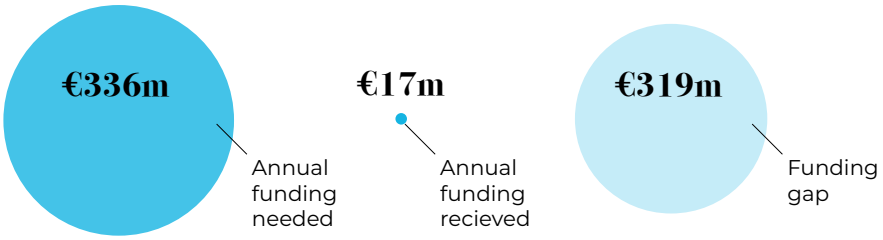
4 Blue Infrastructure funding: The case for marine meadows

4.1 State of the art on seagrass investment

The **financing gap** to halt and reverse biodiversity loss is estimated at €613 billion per year[8]. In the ocean, an estimated financing gap of €150 billion per year remains to deliver Sustainable Development Goal 14 'Life Below Water'. Narrowing down to the European Union, the region faces an estimated €19 billion annual gap in the investment needed to achieve the EU Biodiversity Strategy for 2030[5]

As far as ***Posidonia oceanica*** conservation in the Mediterranean is concerned the annual funding needed per year is: €336 million. Yet, the current funding received annually is €17 million. Overall, leading to a **Mediterranean funding restoration gap of €319 million euros per year** [9].

Figure 3 - The Mediterranean funding restoration gap



Seagrass restoration is still an **emerging field** in marine **natural capital markets**. Only €3.35 billion across 237 projects from 161 different funders in 127 countries have been actively invested in the restoration of coastal and marine ecosystems between 2015-2022. Within this contribution from the private sector, it is still far from Global Biodiversity Framework target 19 goals[10]. **Across the global database, €75 million has been allocated to seagrass projects (7%) for 40 projects (~19% of total) or approx. €1.88 per project on average.**

Out of these, only 8 projects have received private sector funding (20%). Within Europe, Mediterranean countries and the United Kingdom, only 5 private sector seagrass projects are recorded, for a total funding of approximately €15.6 million but across all funding providers. Overall, **seagrass projects receive a relatively minor share of funding** compared to more prominent ecosystems globally (mangroves, coral reefs), and **within the European continent**, terrestrial projects predominate[10].

4.2 Preserving marine meadows

Seagrass meadows restoration can be achieved in two ways. One being creating new meadows where they used to exist in the past (active restoration), the other consisting of reducing or removing the impacts that erode marine meadows, thereby allowing them to recover by themselves (passive restoration).

Active restoration includes direct interventions to help ecosystems recover, such seagrass seeding techniques[11].

[5] EC, 2025; [8] IFC, 2023; [9] Blue Seeds, Mediterranean Posidonia Network, WWF Med & OFB, 2024; [10] UNEP-WCMC, FFI & ELP, 2020; [11] Redeia, IMEDEA, CSIC-UIB, 2024

Seagrass seed sowing is the most effective and economical method for large-scale restoration. According to experts[12] restoration projects reporting highest survival (57%) used a range of techniques, including transplantation of seagrass seedlings, sprigs, shoots, or rhizomes. These methods require ongoing monitoring and adaptation of strategies based on observed results.

The average reported costs for **active restoration** of one hectare of seagrass meadows, according to specialists[12] range between €516k - and €942k. In 2024 in the Balearic Islands (Spain) an active **seagrass restoration project reported costs of €250 (i.e, €2.500.000/ha) per m² of Posidonia.**

Passive restoration involves protecting and managing existing habitats to allow nature to recover on its own. This approach relies on the natural resilience of ecosystems and focuses on minimizing disturbances such as installing eco-moorings and eradicating illegal anchoring, verifiable reduction of a point-source pollutant affecting a meadow, effective surveillance and enforcement to prevent damage.

Both active and passive restoration techniques are essential to protect underwater ecosystems, as they upgrade the ecosystem extent and condition. **That in turn, leads to passive restoration being the most impactful and efficient approach for seagrass conservation[2]. According to recent data from the Balearic Islands, the conservation costs derived range from** 57,80€/ha/year – 38,1€/ha/year.

> **“Overall, seagrass projects receive a relatively minor share of funding compared to more prominent ecosystems globally**

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Notes:
*For year 2010. In 2024 in the Balearic Islands (Spain) an active seagrass restoration project reported costs of €250 per m2 of Posidonia.
** Average price

[12] Bayraktarov et al., (2016); [2] WWF MMI, 2025

5 Monetizing Ocean Resilience: Pathways to Financial Return

5.1 Nature Markets as part of the solution

Nature markets refer to economic systems or mechanisms that assign value to nature and its services, enabling financial transactions that support conservation, restoration, and sustainable use of natural resources. These markets create incentives for protecting ecosystems by linking ecological outcomes (like carbon sequestration or biodiversity gains) with economic value.

They are essential tools for **unlocking investment, aligning incentives, and sustaining** long-term seagrass restoration efforts. When properly designed and regulated, they can complement policy and community-led conservation by bringing **financial capital and accountability** into ecological restoration.

The table below includes four types of nature markets: asset, intrinsic, credit and derivative markets, while it brings definition, value type, example activities and market characteristics of each one.

Table 1 Types of Nature Markets relevant for valuing seagrass ES

Type	Asset Markets	Intrinsic Markets	Credit Markets	Derivative Markets
Definition	Markets that trade rights to use ecosystem assets and the services they provide.	Involve the exchange of provisioning, regulating, or cultural ecosystem services.	Markets that trade credits representing efforts to enhance or conserve ecosystems.	Financial products that reflect the value of ecosystem services or assets.
Value Type	Stock of value; long-term revenue potential.	Annual production value; often cultural or subsistence-based.	Annual flow of value; policy-driven.	Can represent both stock and flow values.
Example Activities	· Leasing rights for sustainable aquaculture · Eco-resort concessions · Marine spatial planning zones	· Whale watching tours · Recreational diving/ snorkeling · Coastal heritage tourism	· Blue carbon credits from mangrove restoration · Seagrass conservation credits	· Insurance products for coral reef protection · Ocean risk hedging instruments
Market Characteristics	Requires enforceable property rights and long-term investment.	Emerges from cultural, recreational, or subsistence value.	Driven by environmental regulations and voluntary commitments.	Tied to financial markets; often used for risk management or speculation.

Source: Adapted from Taskforce on Nature Markets, 2023[13]

5.2 Market based instruments for marine meadows funding restoration

For seagrass restoration to attract significant private capital, clear pathways for financial return are essential. Moving beyond traditional funding models to embrace **market-based instruments** that capture the economic value of restored ecosystems is essential to overcome ocean needs. In other words, building the business case to provide revenues arising from restoration and conservation activities is key and **Market-Based Instruments** (**MBIs**) play a crucial role. MBIs are **indirect regulatory instruments**, which influence actors' behaviour by changing their economic incentive structure. MBIs are **tools used in environmental policy which include taxes, emission trading systems, removal of perverse incentives, liability rules and deposit-refund**[14]. Instead of relying solely on regulations or direct government interventions, MBIs **leverage economic incentives to promote environmental benefits.** These types of policies work by reflecting the environmental impact of a certain action by attaching a cost to it and providing an incentive to the polluter to reduce his impact. However, nature credits sets a new paradigm for MBIs by providing an investment tool oriented to reward nature positive outcomes versus other MBI's focussed on reducing impacts.

> "These markets create incentives for protecting ecosystems by linking ecological outcomes (like carbon sequestration or biodiversity gains) with economic value.

Overall, **MBIs aim to incorporate the environmental costs into market pricing, encouraging more sustainable behaviour from businesses and consumers**.

A **key characteristic** that these MBI must meet is to generate "**additionality**". This means the scheme should bring additional benefits that would not have been achieved without its implementation. In that sense, the goal of MBI's is to close the finance and management loop between beneficiaries of ES and the stewards of the ecosystems that enable these services.

Among emerging MBIs, several has been considered within this report for marine meadows depending on the activities that might provide this additionality, the length of the agreements and the nature of restoration activities:

A. Payment for Ecosystem Services (PES): Linking Beneficiaries to Outcomes
A foundational approach involves structuring **Payment for Ecosystem Services (PES)** schemes. These innovative models facilitate direct payments *from* entities benefiting from restoration (like tourism operators profiting from clearer waters) *to* the projects delivering those verified services. PES typically involves voluntary agreements where pre-defined, monitored environmental improvements trigger compensation. This creates sustainable, localized funding cycles directly reflecting the economic utility of the restored ecosystem. These agreements must be renewed on an annual basis through annual transactions to guarantee that positive outcomes are provided, otherwise the system shouldn't be provided with additionality. Therefore, once the activity is finished, the payment is over.

[14] Görlach, 2013

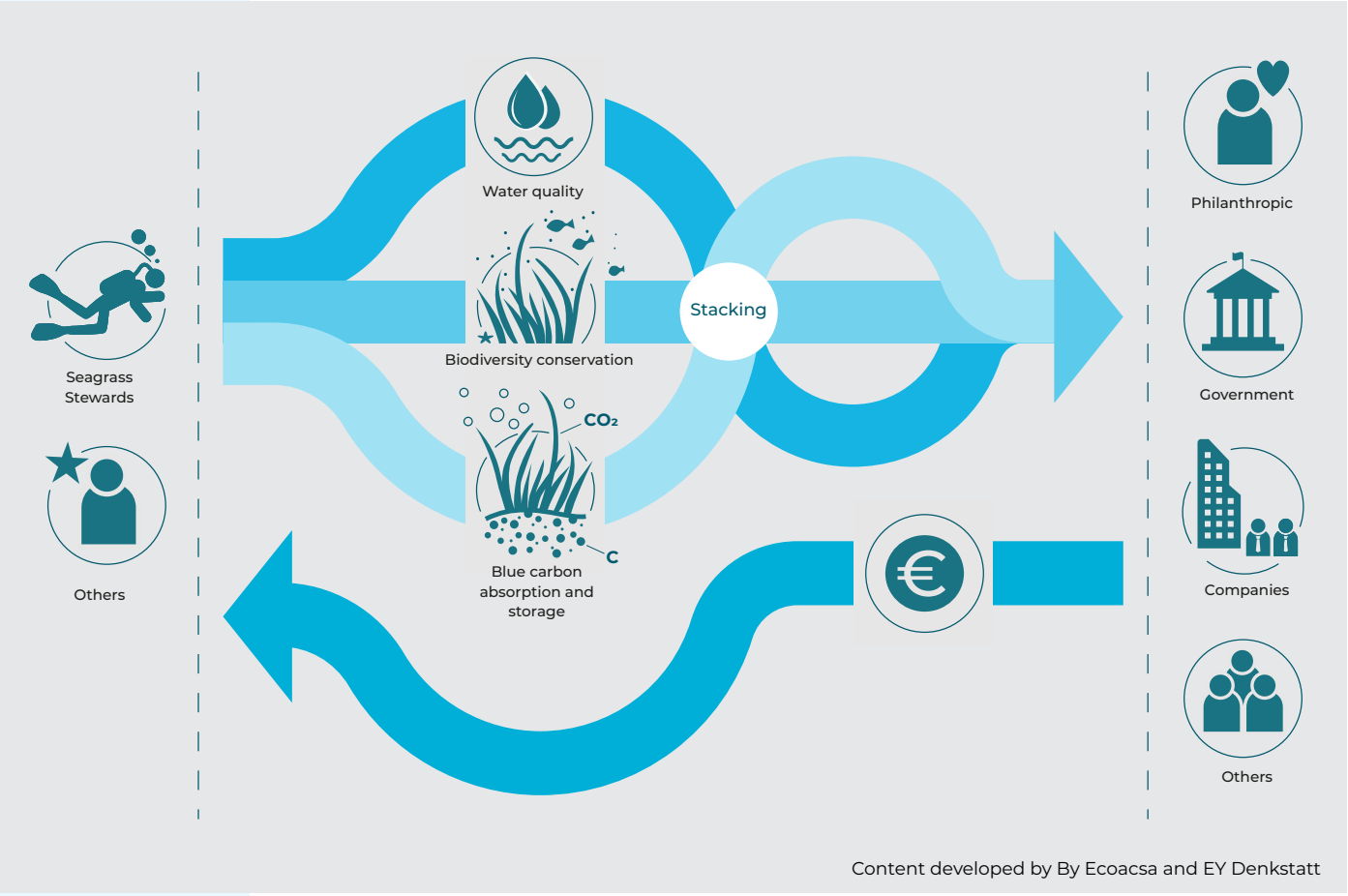

Figure 3 - Local financing mechanisms for seagrass restoration

B. Blue Carbon Credits: Tapping into Climate Finance

Seagrass meadows are powerful carbon sinks, making **Blue Carbon Credits** a major potential revenue stream. By rigorously quantifying the additional carbon sequestered through restoration, or carbon sinks that have been avoided to be released to the atmosphere through conservation activities or passive restoration, projects can generate verified credits tradable on burgeoning voluntary and compliance carbon markets. Growing corporate demand for high-integrity, nature-based climate solutions makes this attractive. Success hinges on credible Monitoring, Reporting, and Verification (MRV) – a core focus of the ARTEMIS methodology.

Notwithstanding, some studies suggest that Blue carbon credits by themselves are not enough for financing seagrass restoration projects .

Box 1 - Example of regional blue carbon standard

SPAIN. Cabo de Gata, Andalucía
Start date 2011–End date 2017. (LIFE – Blue Naura, 2016[1])

The LIFE – Blue Natura project aimed to restore *Posidonia oceanica* seagrass meadows across 11 hectares in the protected area of the Natural Park of Cabo de Gata-Níjar. The restoration plan involved replacing traditional boat mooring systems, which used concrete blocks and chains, with advanced fixed mooring structures. However, the estimated cost of these works was €273,000, with the costs of validation, verification and monitoring not included.

Measuring seagrass carbon to the precision required for formal accreditation is too expensive given current prices and total carbon stocks involved. The project estimated a total CO2 absorption of 684 tCO2e over 50 years and was ultimately not implemented due to financial instability, the high fixed and variable costs, and the low anticipated price of carbon credits. Some conditions that might enhance the uptake of blue carbon credits would be valuation of seagrass co-benefits in the schemes, such as biodiversity and other ecosystem services.

> “Seagrass restoration projects, demonstrably enhancing marine habitats, are prime candidates for generating high-integrity credits in this emerging market.

C. Biodiversity Credits (Nature Credits): The Next Wave in Environmental Markets
While carbon represents a significant opportunity, the financial case for seagrass extends further, incorporating broader nature values and innovative mechanisms such as biodiversity credits.

A **biodiversity credit is a measurable, evidence-based unit representing positive biodiversity or nature outcomes** achieved through restoration activities **that are additional and durable**[15].

Companies can purchase these credits to meet nature-positive commitments, to insurance operations, access ecosystem services, support green claims, enhancing subsidy programs or green investments and fulfill disclosure requirements.

Seagrass restoration projects, demonstrably enhancing marine habitats, are prime candidates for generating high-integrity credits in this emerging market.

Biodiversity credits are not just a tool—they’re a **transformational model for conservation**. Scaling success requires three key elements:

I. Robust and agreed metrics to guarantee that nature is measured in the right way.

II. Building the legal and financial infrastructure to support the market at a European level which will include integrity safeguards, traceability, contracts, new Asset class...

III. Construct the demand based on amending the current regulation (CSRD, CDDD or Nature Restoration Law...) to provide clear signals and clear policy to boost the market.

Box 2 - Structure & Design of Biodiversity Credit Projects: 1-Year Design & Registration Timeline

Phase	Key Actions
Definition	Define scope, type, and goals of the project
Due Diligence	Select restoration actions; baseline structuring
Monitoring	Create biodiversity monitoring scheme; define impact milestones
Legal	Land tenure analysis, government consultation, collaboration agreements
Financial	Develop financial model, investment plan, and fiduciary trust
Commercial	Build sales plan, marketing, and commercialization strategy
Risk	Design risk management tools and identify mitigation strategies
Registration	Finalize and register the project

[15] CDC Biodiversité et al., 2024

To operationalize marine meadow restoration through market-based instruments, a network of key actors collaborates across financial, ecological, and regulatory domains. Blended finance—comprising public and private banks, businesses, and philanthropic sources—is an approach which provides initial capital through loans or donations to the business or NGO responsible for seagrass restoration. By upgrading the extent and condition of seagrass meadows, the ecosystem services which they provide; such as water quality enhancement, carbon storage and sequestration, coastal protection, and biodiversity protection are likewise improved, and can be monetized via market mechanisms like biodiversity and carbon credits, which are certified by a third-party certifying company.

Businesses purchase these credits to meet sustainability goals, creating a return on investment while supporting ecological outcomes. Beneficiaries of the restored ecosystem, including tourism operators and local communities, contribute financially through service use, while public administrations benefit from tax revenues generated by these activities. This integrated model aligns ecological impact with financial viability, ensuring long-term sustainability of marine meadow restoration efforts.

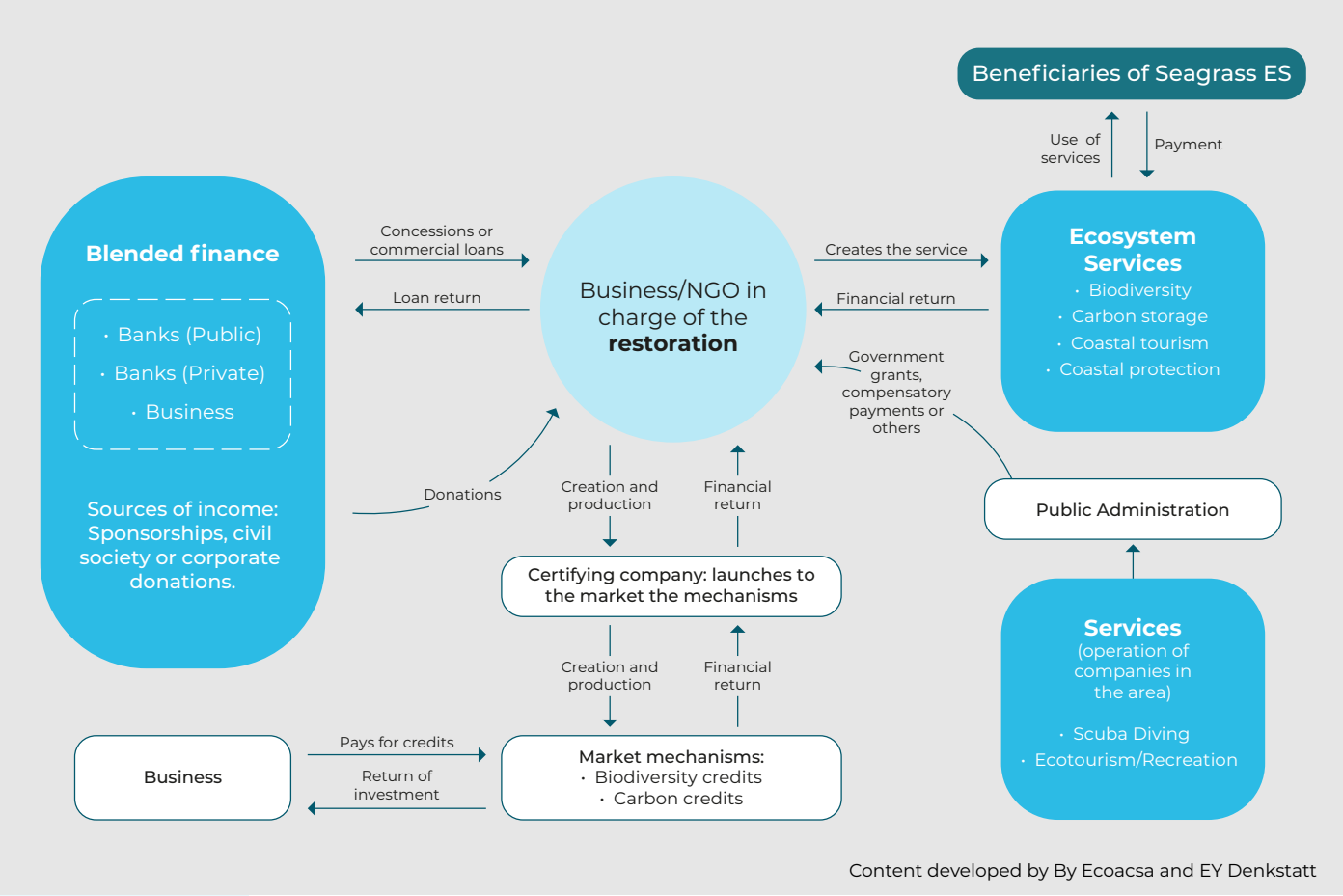

Figure 4 - Integrated finance Model

5.3 Accounting for value creation & monitoring

> “By linking environmental data with economic activities, investors can make informed decisions that consider both sustainability and profitability.

Natural capital is the foundation of human well-being and economic development.

The System of Environmental-Economic Accounting (SEEA) Framework is the international framework of natural capital accounting. It defines natural capital as the stock of renewable and non-renewable assets or resources that combine to generate a flow of benefits to people.

The ARTEMIS project is aligning with the SEEA Ecosystem Accounting (SEEA EA), which constitutes an integrated and comprehensive statistical framework for organizing data about habitats and landscapes, measuring the ecosystem services, tracking changes in ecosystem assets, and linking this information to economic and other human activity[16]. The SEEA - EA has been in place since 2021 and guides the work of ARTEMIS in all work packages.

The SEEA - EA framework is at the heart of the concept of the natural capital approach. It is based on a standardized and internationally recognized framework which features an integrated view on sustainability and climate change. It allows users to identify interdependencies between natural assets and resources, including socio-economic impacts as well as quantify the impacts to identify mitigation measures. The spatial extent and condition of ecosystems can be measured whether they are protected or not.

This framework provides a clear picture of the status and trends of natural resources, helping to assess the potential impacts on business and investment opportunities. By linking environmental data with economic activities, investors can make informed decisions that consider both sustainability and profitability.

5.4 Market size

Understanding the **scale of the opportunity,** assessing the **potential returns,** and evaluating the **viability** and **growth potential** of the project or business is fundamental in the context of nature-based investments like **seagrass restoration.**

To shed some light on initial estimates of the market size of *Posidonia oceanica* active and passive restoration activities, we formulate the hypothesis that credits may only be calculated when providing additionality. In this sense, a Posidonia credit only has value if the restoration action generating it is additional, meaning that:

- The improvement in the meadow condition (and the state of the Posidonia meadow) would not have occurred in the absence of the credit-financed restoration project.
- The action goes beyond existing legal obligations (e.g., if a company is legally required to restore damage, that doesn’t generate additional voluntary credits unless the restoration significantly exceeds the obligation).
- The action would not have been financially viable or would not have been undertaken without the expected revenue from credit sales

To evaluate not only the market size of active restoration, but also passive restoration we provide next different graphs for each type of technique and its respective potential market uptake.

Graphs show the different scenarios; which account for:

[16] UN, 2025

Scenario 1: Conservation Niche

This scenario represents a conservative, lower-bound estimate for the seagrass market in the Mediterranean. It assumes that:

- Only a small number of conservation-focused organizations and marine research institutions engage in restoration or protection efforts.
- Regulatory frameworks for marine credits remain underdeveloped, there are no regulatory actions nor changes.
- Nature credits linked to seagrass are rarely used in corporate sustainability strategies or green product claims.
- Restoration projects are localized, often driven by NGOs or EU-funded pilot programs, with limited private sector involvement.
- Voluntary market demand remains low, with low transaction volumes and limited scalability. Credits are mostly symbolic or used for CSR reporting by a few early adopters.

> **"The marine restoration market is poised for significant growth between 2030 and 2050. Alignment between private capital and public policy is essential to unlock the full market potential.**

Scenario 2: Marine Momentum

This scenario reflects a moderate, central-upper estimate, assuming steady progress in marine credit markets:

- EU and Mediterranean governments begin to integrate seagrass restoration into marine spatial planning and blue economy strategies. There are regulatory changes boosting restoration actions.
- Corporate nature targets become more common, especially among tourism, shipping, and coastal development sectors.
- Standardized methodologies for measuring and verifying seagrass restoration outcomes are developed, increasing investor confidence.
- Public-private partnerships emerge to scale restoration efforts, especially in marine protected areas (MPAs).
- Voluntary market demand from sustainability-oriented companies and regional policy support grows steadily. *Posidonia oceanica* becomes a flagship habitat in Mediterranean credit schemes.

Scenario 3: Marine Restoration Markets Breakthrough

This scenario envisions a high-growth, transformative future for seagrass markets:

- Regulatory frameworks for driving ocean protection are operationalized to meet obligations under EU and international biodiversity frameworks. There are numerous regulatory actions and changes boosting seagrass restoration.
- Financial innovation (e.g., blue bonds, biodiversity-linked loans) channels significant capital into ocean restoration.
- Widespread adoption of nature targets and mandatory disclosures drive demand for marine credits.
- Tech-enabled monitoring (e.g., satellite, AI, underwater drones) ensures transparent and scalable verification of outcomes.
- Voluntary market demand for restoration rises exponentially. The *Posidonia oceanica* market becomes a core component of the Mediterranean blue economy, with high liquidity, strong investor interest, and integration into global nature markets.

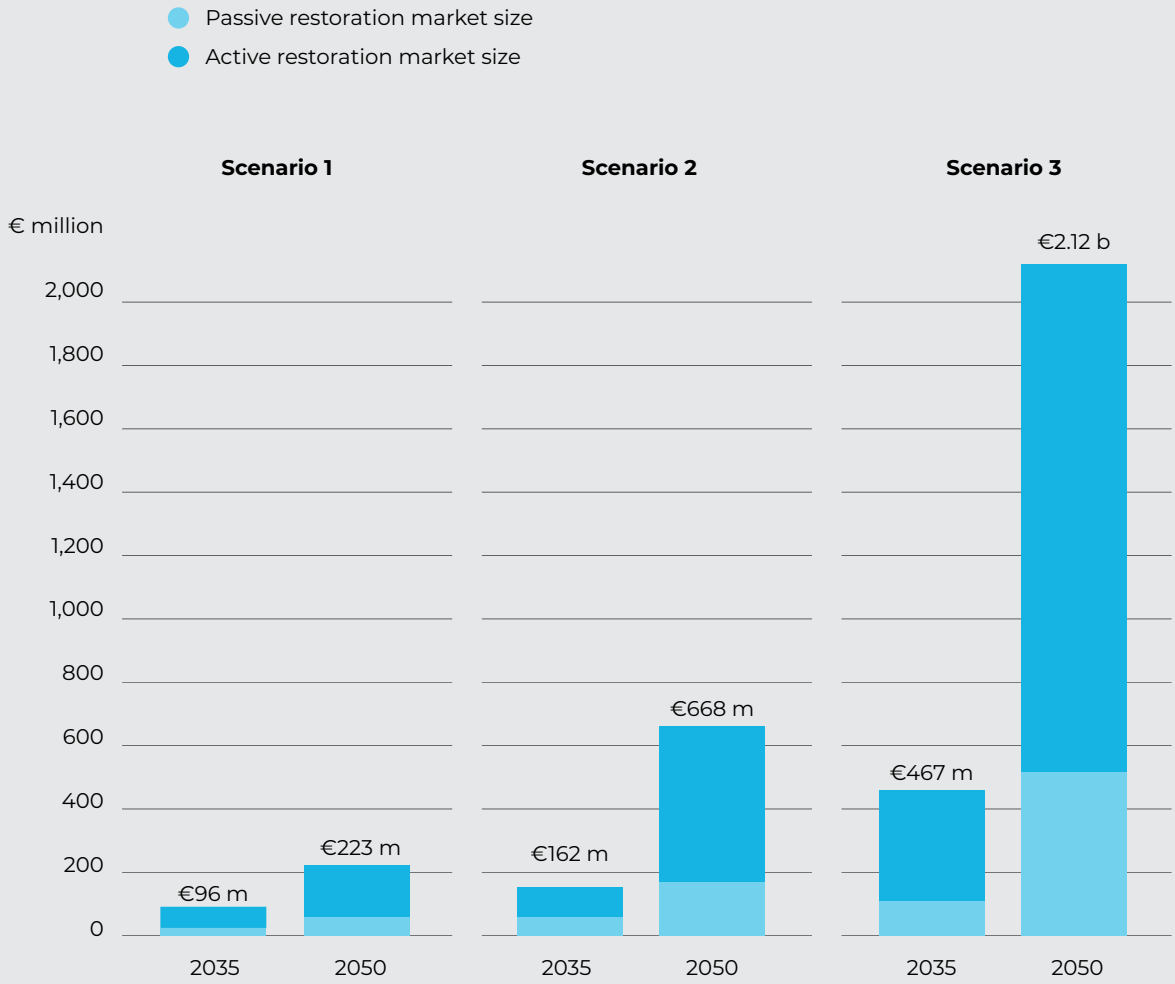

Figure 5 - Estimated Marine Restoration Market Evolution (2035-2050)

The marine restoration market is poised for significant growth between 2035 and 2050. Alignment between private capital and public policy is essential to unlock the full market potential.

Key Insights

- **Credit Prices Increase:** From €34,033 per hectare in 2035 to €41,221 per hectare by 2050, reflecting rising demand and ecosystem value.
- **Active Restoration Dominates:** By 2050, active restoration accounts for over 60% of market value across scenarios.
- **Transformative Potential:** The breakthrough scenario drives market size beyond €1.3 billion by 2050, representing nearly 6x growth compared to 2035 under limited development.

6 Final takeaways

There is a funding gap in *Posidonia oceanica* conservation of: €319 million euros per year[9]. Hence, **structuring seagrass investments in the Mediterranean region is urgent.**

From Ecosystem Services to Revenue Streams

Tangible opportunities exist for deploying capital into Mediterranean seagrass restoration projects. Investors can consider several distinct avenues:

- **Targeting Maritime & Coastal Industries with Blue Carbon+ Portfolios**: Fund restoration generating high-integrity **Blue Carbon credits bundled with verified co benefits** (biodiversity, resilience) for shipping, ports, and coastal developers needing climate and nature-positive solutions.
- **Integrating Restoration into Regenerative Coastal Development & Tourism**: Incorporate seagrass restoration as **'Green Infrastructure'** into real estate or tourism projects to enhance value, meet regulations, boost eco-appeal, and reduce climate risk. Finance via PES or direct investment.
- **Enhancing Sustainable Fisheries & Aquaculture through Targeted Funds**: Invest in restoration proven to **boost nursery habitats** for commercial fish or **improve water quality** for shellfish farming. Generate returns through improved yields or PES from the sector.
- **Creating Dedicated Seagrass Restoration Impact Funds:** Participate through **dedicated investment vehicles** pooling capital for a diversified portfolio of projects, leveraging economies of scale and standardized MRV (informed by ARTEMIS). Structure via blue bonds or dedicated funds.

De-Risking Blue Investments: The Pillars of Credibility and Transparency

For natural capital markets like seagrass restoration to attract mainstream investment, demonstrating credibility, transparency, and robust governance is of paramount importance. Several interconnected elements provide this necessary foundation. The necessary factors that must be included in the proposal to ensure credibility on the part of the investor are on the one hand; an **MRV system for seagrass credits**.

Such a system shall include variables to be monitored: i.e., extent and condition of the meadows, associated biodiversity and blue carbon sequestered and absorbed. Besides, a viable MRV should ensure the frequency and method, for example satellite images and in situ campaigns. Lastly, on the external certification: some key questions such as what standard? Who validates it? Remain to be seen.

On the other hand, investors must ensure that **natural capital accounting** is the backbone of the proposal to guarantee additionality; quantify the value generated; and provide a robust system for monitoring the progress of restoration success over time.

[9]Blue Seeds, Mediterranean Posidonia Network, WWF Med & OFB, 2024;

Seagrass Restoration: A Strategic Business Move

Investing in the restoration of Mediterranean seagrass meadows is more than an environmental gesture. It represents a calculated, strategic decision with the potential to:

- **Generate Financial Returns:** Access growing carbon and biodiversity credit markets, develop PES revenues.
- **Mitigate Critical Risks:** Enhance coastal resilience, meet regulatory requirements, manage reputational risk.
- **Unlock Significant Co-Benefits:** Support fisheries, tourism, and local communities.
- **Gain Early-Mover Advantage:** Lead in the expanding blue finance sector.

All in all, **seagrass restoration offers opportunities for innovation, value creation, and ocean leadership with high-impact potential.**

> “Investment for protection as a premium marine asset class

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Acknowledgements

We gratefully acknowledge the contributions of stakeholders and global experts consulted between 2024 and 2025. Ministry for the Ecological Transition and Ministry for Ecological Transition and the Demographic Challenge (Spain).

- **Andalusian Government (Spain)**
- **Balearic Government (Spain)**
- **Redeia (Spain)**
- **Associació Vellmarí (Spain)**
- **Clean Wave Foundation (Spain)**
- **Association for Coastal Ecosystem Services I ACES (UK)**
- **Mikoko Pamoja and Vanga Blue Forest Projects (Kenya)**
- **Mediterranean Posidonia Network (Europe)**
- **International Union for Conservation of Nature I IUCN-Med (Europe)**
- **Endangered Landscapes and Seascapes Program (Europe)**
- **Inter-American Development Bank (Latin America and the Caribbean)**
- **Development Bank of Latin America and the Caribbean I (Latin America and the Caribbean)**
- **Coalition for Private Investment in Conservation I CPIC (Global)**
- **Kreditanstalt für Wiederaufbau I KfW Bank (Global)**
- **South Pole (Global)**
- **Sustainable Surf Foundation / SeaTrees (Global)**
- **The Pew Charitable Trusts I Coastal Wetlands and Coral Reef Project (Global)**
- **UNDP The Biodiversity Finance Initiative I (BIOFIN) Global**
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Glossary

Additionality: Proof that benefits would not occur without the intervention. Non-negotiable criterion for credit issuance and investor validation.

De-risking: Techniques that reduce perceived investment risk. Includes co-financing, MRV assurance, legal clarity, and credit pre-certification.

Ecosystem Services are the benefits that natural ecosystems provide to humans, supporting life, economies, and well-being.

Natural capital is the stock of renewable and non-renewable natural assets or resources that combine to generate flows of benefits to people. It is quantified and reported alongside financial capital under SEEA-EA for ESG integration.

Natural capital markets are financial systems that assign economic value to nature's resources and ecosystem services, allowing them to be traded like other commodities. These markets create economic incentives for conserving and managing ecosystems by recognizing their financial worth.

Blue carbon is the carbon stored in coastal and marine ecosystems, particularly in mangroves, saltmarshes, algae and seagrass in their biomass and sediments. It also relates to carbon stored in seabed sediments, fish and shellfish.

Blue carbon credits represent a financial tool designed to mitigate climate change by reducing, removing, or avoiding CO_2 emissions through the conservation, restoration, protection, and sustainable management of coastal ecosystems such as mangroves, seagrasses, and salt marshes.

Biodiversity credits are units of biodiversity value created through conservation activities that have led to a biodiversity gain. They are also defined as innovative market-based instruments designed to finance and promote conservation efforts while ensuring positive biodiversity outcomes that can be bought or sold.

Market-Based Instruments (MBIs) are economic tools that reflect environmental costs and create incentives (e.g. credits, taxes). MBIs enable profit-driven restoration through regulated and voluntary markets.

Target 19 of the Kunming-Montreal Global Biodiversity Framework: focuses on mobilizing and increasing financial resources for biodiversity conservation. It aims to substantially and progressively increase biodiversity-related funding from all sources—public, private, and innovative financial mechanisms—ensuring that nature-positive investments grow while harmful subsidies are phased out.

Payment for Ecosystem Services (PES): Agreements where beneficiaries of nature (e.g. hotels, fisheries) pay ecosystem stewards for conservation. PES schemes create local revenue loops tied to tangible service delivery (e.g. water clarity, fish biomass).

Restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. It refers to the process of actively or passively supporting the recovery of

i) Ecosystems towards good condition,

ii) Habitats up to the highest level of condition attainable and its favourable reference zone,

iii) Habitats or species to a level of sufficient quality and quantity, or populations to satisfactory levels, with the aims of conserving or enhancing biodiversity and ecosystem resilience.

Passive restoration can be defined as mitigating human threats to favorize natural regeneration when natural recovery potential is high, making it the most cost-effective approach.

Active restoration is the process of actively assisting the reestablishment or increase of organisms or depleted populations through assisted regeneration or reconstruction.

Annex I

By implementing the following policy recommendations, seagrass PES markets may be operationalized faster in the Mediterranean region and beyond. This, in turn, could enable wider-scale seagrass meadows restoration projects to develop. Thereby helping to achieve coastal conservation, while ensuring environmental, economic, and social benefits for local communities and the ecosystems they depend on.

Table 2 - Policy enablers for a PES market to develop

Recommendation Area	Key Policy Actions
Strengthening Legal and Institutional Frameworks	• Establish clear and secure tenure rights to ensure that beneficiaries and conservation stakeholders have legal recognition in PES schemes. • Develop a robust regulatory framework to integrate marine biodiversity and blue carbon credits into environmental and economic policies. • Standardize methodologies for measuring and verifying biodiversity and carbon sequestration outcomes. • Develop global standards and certified accreditation mechanisms.
Enhancing Governance	• Implement transparent monitoring and reporting mechanisms to measure PES project impacts and ensure credibility. • Establish clear standards and criteria for company involvement.
Advancing Research and Data Availability	• Collect and disseminate accurate data on ecosystem services and their economic value to support decision-making and incentive design. • Expand pilot programs in marine protected areas to demonstrate the viability of biodiversity and blue carbon credits.
Capacity Building and Equitable Benefit Distribution	• Implement training programs to strengthen the skills of local communities in managing PES projects: ocean literacy, systematic reframing of restoration as an investment activity, reframe investment for nature as a slow process and as the payoff of our 'dept' to future generations.
Exploring Innovative Financing Models	• Develop impact investments and conservation-linked bonds tied to coastal tourism to diversify funding sources. • Promote participation in international biodiversity and carbon credit markets to expand these schemes' reach.
Climate Change Adaptation and Nature-Based Solutions	• Prioritize nature-based solutions as a sustainable alternative to traditional coastal protection infrastructure. • Promote the restoration of coastal ecosystems such as seagrasses to enhance ocean and climate resilience to climate change.
Local Stakeholder Participation	• Foster collaboration among governments, NGOs, and the private sector through public-private partnerships to drive conservation and restoration efforts. • Engage local communities as active participants in biodiversity and blue carbon credit projects to ensure equitable benefit-sharing.
Equitable Benefit Sharing	• Ensure that economic benefits from coastal tourism, biodiversity, and blue carbon initiatives are distributed.

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