ARTEMIS

Accelerating the Restoration of Seagrass Meadows in the Mediterranean area through Innovative ecosystem-service based Solutions

Euro-MED0200867

Protecting, restoring and valorising the natural environment and heritage

Version: 1

Date: 02/06/2026

Main Author(s): MEDSEA Foundation

Contributions from: Oscar Serrano, Christian Sansoni

ARTEMIS

Peer Learning Session

From Science to Market: Nature Credits for Posidonia oceanica

Internal Report

ARTEMIS | Interreg Euro-MED | Co-funded by the European Union

07/05/2026

ARTEMIS | Interreg Euro-MED | Co-funded by the European Union

0 Methodological Note

This report integrates the outcomes of the ARTEMIS Peer Learning Session held on 7 May 2026, *"What Can We Really Say? From Data to Credible Messages"*. The session featured two speakers: **Dr Oscar Serrano** (marine ecologist, specialist in blue carbon and seagrass ecology) and **Christian Sansoni** (founder of Ecosostenibile.eu, carbon credit and sustainability startup). The discussions were moderated by MEDSEA Foundation within the ARTEMIS project framework.

The session addressed a central challenge for ARTEMIS: how to translate scientific evidence on seagrass ecosystem services into credible, bankable, and market-ready claims for nature credits.

Original Gap (ARTEMIS)	Session Response
Complex and highly technical scientific evidence	Practical framework for translating science into credible project pitches
Lack of unified crediting standards for marine ecosystems	Overview of existing crediting standards (Verra, Gold Standard, CRCF)
Financial gap: most blue carbon projects are not yet cost-effective alone	Stacking nature benefits to bridge financial viability
Limited supply of certified blue carbon credits despite growing demand	Communication discipline: clarity, evidence-based messaging, transparency on limits

1 Ecosystem Services and the Scientific Foundation

The following outputs are directly derived from the presentations and discussions during the session.

Seagrass Ecosystem Services Beyond Blue Carbon

Oscar Serrano opened by reframing the value of *Posidonia oceanica* and other seagrasses beyond their role as carbon sinks. The full portfolio of ecosystem services includes:

- Water quality improvement: seagrasses filter and sink nutrients and pollutants, acting as buffers against ocean acidification
- Coastal protection: seagrass meadows stabilise coastlines and reduce beach erosion, replacing costly engineered interventions
- Biodiversity habitat: crucial nursery grounds supporting juveniles and the trophic web across fisheries and tourism species
- Fisheries support: sea cucumbers, sea urchins, and key commercial fish species depend on healthy meadows
- Tourism and water clarity: the exceptional water clarity of areas such as the Balearic Islands is directly linked to the presence of extensive Posidonia meadows
- Food security and bioenergy: emerging contributions to coastal food resources and biofuel markets

Serrano recommended linking all project claims explicitly to the UN Sustainable Development Goals (SDGs), noting that seagrasses contribute across virtually all 17 goals. When pitching to investors or policymakers, establishing these SDG connections strengthens the legitimacy of the project.

Linking Ecosystem Services to SDGs

Key recommendation: when building a project pitch, identify which SDGs your project addresses and use them explicitly to support your claims. Seagrasses contribute to SDGs 1, 2, 3, 8, 13, 14 and 15, among others — covering climate, food, employment, oceans and biodiversity.

2 Scientific, Political and Social Needs for Nature Credits

Four Core Needs Identified

Serrano structured the scientific and political landscape around four interconnected needs for any credible nature credit project targeting Posidonia:

1. Tools to evaluate shifts in habitat condition and associated benefits

Projects must define what constitutes a "good condition" meadow versus a degraded one, establish metrics and thresholds for transitions between

states, and link habitat improvement to measurable benefit uplift (e.g. fish biomass, biogenic sand, biodiversity indices). The Water Framework Directive intercalibration work provides a solid starting point for Posidonia condition indicators across Mediterranean countries.

2. Crediting methods for each conservation/restoration activity

Different activities (reducing dredging, improving water quality, active restoration of dead mats, mooring management) require distinct crediting methods. A single universal method cannot apply to all interventions. Scoring criteria include additionality, MRV feasibility, scientific evidence, associated emissions, and conservation estimates.

3. Crediting standards to generate certified credits

Recognised standards (Verra, Gold Standard, Australia's Nature Repair Market, EU Carbon Removal and Carbon Farming Framework / CRCF) are essential for market access. Without certification by an independent third party, credits carry no financial weight.

4. New markets and sustainable business models

The voluntary carbon and nature credit markets are growing rapidly. Blue carbon credits currently sit almost entirely within the voluntary market. Sustainable business models must stack income streams beyond credits to achieve financial viability.

Blue Carbon Additionality: The Key Concept

A crucial distinction was drawn between types of carbon benefit:

- Creation of new habitat: generates additional carbon in biomass and soil, with annual increments in soil thickness
- Conservation and restoration: gains carbon through biomass growth and sediment accrual, but — critically — also avoids emissions from ancient soil carbon stocks accumulated over hundreds to thousands of years

Critical gap: the avoided emissions from ancient soil carbon — the largest component of carbon abatement — are not yet accounted for in current methodology. This represents both a scientific frontier and a future commercial opportunity for ARTEMIS restoration sites.

Monitoring Tools: eDNA and Cost-Effectiveness

Environmental DNA (eDNA) was highlighted as a monitoring tool combining scientific rigour with practical cost advantages:

- Provides standardised, replicable data on biodiversity in lost, restored, and resilient seagrass meadows
- Labour cost is minimal (one sampling day at sea) compared to traditional diving and fieldwork analysis
- Addresses the risk posed by the retirement of experienced taxonomists, reducing subjectivity in species assessments

The recommendation for ARTEMIS: when designing MRV (Measurement, Reporting and Verification) plans, evaluate the cost-benefit of each monitoring tool against the specific ecosystem service being claimed.

3 The Blue Carbon Market: State of Play

A Market of Enormous Potential and Critical Bottlenecks

Christian Sansoni provided a market-side perspective, opening with a striking paradox: despite over a decade of sector development, fewer than 7 million blue carbon credits have been issued globally — an amount that would not cover the annual offsetting requirement of a single large airline preparing for CORSIA compliance in 2028.

Supply side	Demand side
94 registered blue carbon projects worldwide	S&P Global Blue Carbon Index at record levels
Only 10 actively issuing credits	Companies competing for a supply that barely exists
3–5 years from feasibility to first credit issuance	Large corporations, sovereign wealth funds and central banks integrating climate risk into compliance frameworks
Fewer than 12 accredited verification bodies worldwide with genuine blue carbon expertise	Capital seeking measurable, verified environmental impact

Three Structural Bottlenecks

- Carbon rights ambiguity: in many countries, overlapping jurisdictions between forestry departments, maritime authorities, regional governments and indigenous communities make it impossible to proceed without legal clarity on who holds the right to market the carbon from a given site
- Integration gap: blue carbon development requires simultaneous expertise in community engagement, satellite analysis, field ecology, carbon accounting, regulatory compliance and financial modelling — skills that currently belong to different actors with no unified coordination
- Limited verification capacity: fewer than a dozen bodies worldwide hold genuine expertise in blue carbon; validation queues run 6–12 months

The Compliance and Voluntary Markets

The carbon market is divided into two families:

Compliance Market (ETS)	Voluntary Market
Regulated by law; companies exceeding emission caps must buy permits. In 2024, the EU approved the Carbon Removal and Carbon Farming Framework (CRCF), creating delegated acts for each of the 27 EU member states — the first step toward including blue carbon in compliance frameworks.	Driven by corporate net-zero commitments and reputation strategies. Blue carbon credits currently reside almost entirely here. The voluntary market rewards co-benefits (biodiversity, coastal community protection, local resilience) that compliance markets rarely price — a competitive advantage for well-structured ARTEMIS projects.

4 Communication and Credibility in the Blue Carbon Market

The Communication Trap

Sansoni identified communication as the most underestimated challenge in blue carbon. The market demands certainty; science produces uncertainty. The tension between these two realities generates two dangerous failure modes:

- Oversimplification: projecting scalability that operations cannot guarantee, using unverified numbers, claiming carbon neutrality without defensible data — all of which are now systematically challenged by regulators, investigative journalists and NGOs
- Underselling: excessive caution that fails to communicate the genuine and substantial value of blue carbon ecosystems as climate infrastructure

> *"The solution is not to communicate less — it's to communicate better. Paradoxically, it is honesty about uncertainty, not oversimplification, that builds lasting trust with investors, buyers and regulators."*
> — Christian Sansoni, Ecosostenibile

Three Communication Errors to Avoid

- Carbon neutrality claims: making this promise without being able to defend it with verifiable data under independent scrutiny is a financial and reputational risk
- Unverified numbers: every declared tonne of CO_2 must be linked to a measurement protocol and third-party verification; without this, it is an opinion, not a data point
- Scalability promises: projecting exponential growth in a market where a single project takes 3–5 years to develop does not convince sophisticated investors — it frightens them

The Three-Pillar Communication Framework

1. Clarity

Eliminate jargon when not needed. Use language that decision-makers can understand and verify. Clarity respects the audience's intelligence without sacrificing precision.

2. Evidence-based messaging

Every claim must be traceable to peer-reviewed literature, recognised standards (Verra, Gold Standard, CRCF) and third-party verification. Certification is the gateway to banking relationships and direct credit access.

3. Transparency on limits

Publicly acknowledging where uncertainty exists, where methodologies are still evolving, and where projections carry margins of variability is not a weakness — it is the hallmark of scientific maturity and what sophisticated investors look for before committing capital over a 30-year horizon.

Building Credibility Infrastructure

Three elements that credible projects must invest in from the start:

- Independent validation: certifiers (Verra, Gold Standard) are not bureaucratic formalities — they signal to the market that the project has been examined by someone with no interest in leniency
- Data traceability: every issued credit must have a verifiable story from field inventory to satellite estimate to registry
- Continuous monitoring: sequestration capacity changes over time due to warming waters, human activities and pollution. A credible project monitors, updates and accounts continuously — not just at baseline

5 Business Models and Financial Viability

Why Blue Carbon Credits Alone Are Not Enough

Both speakers converged on a critical financial reality: relying solely on the return from blue carbon credits is insufficient. Credits are issued over a 30-year period; costs of restoration and monitoring are immediate and substantial. At current market prices (often below €50 per credit), most seagrass restoration projects are not financially viable on credits alone.

The Stacking Strategy

The key to financial viability is stacking multiple nature benefits together:

- Biodiversity credits combined with blue carbon credits increase the total return per project
- Ecosystem service co-benefits (coastal protection, fisheries, tourism, water quality) can be priced and certified separately, with an increasing number of standards and buyers willing to pay a premium

- Stacking raises the credit value above the financial threshold where return on credits exceeds implementation costs — the tipping point for at-scale restoration

Gains by Practices vs. Gains by Results

Gains by results (PES)	Gains by practices (environmental services)
Assigns economic values to specific ecosystem services. More precise, but methodologically complex and ethically contested. Requires robust baselines and reference conditions that are often unavailable for biodiversity and blue carbon.	Credits the management methods themselves, based on the best available science. More feasible, more cost-effective, and avoids the methodological challenges of valuing ecosystem services economically. Increasingly preferred by emerging standards.

Recommendation: measure gains by practices rather than by results. This approach is more operationally feasible for Posidonia projects and avoids the volatility and complexity of full ecosystem service valuation.

Sustainable Business Model: The Tidal Moon Example

Oscar Serrano illustrated the business model principle with the example of Tidal Moon (Australia), a company focused on sea cucumber fisheries:

- Core business: aquaculture facilities to reduce pressure on wild fisheries, with product diversification into pharmaceuticals and biotechnology
- Side revenue: research services, educational tourism, nature restoration activities
- Nature restoration embedded within an existing, revenue-generating coastal business rather than depending on it as the sole income

The recommendation for ARTEMIS: identify existing coastal businesses (mooring managers, fishing cooperatives, tourism operators) whose seasonal activities can be extended into restoration work during off-peak months. Build seagrass conservation and restoration within these existing frameworks, rather than creating standalone restoration projects dependent solely on credit income.

The Scale Imperative

A recurring theme was the need to act at scale. Current Posidonia restoration projects in the Mediterranean rarely exceed one hectare. The costs of Monitoring, Reporting and Verification (MRV) make small projects financially unviable in isolation.

Solutions discussed include:

- Aggregating multiple small restoration sites under a single certification and MRV framework to share fixed costs
- Combining aquaculture, renewable energies, seaweed farming and restoration activities within a single blue economy model
- Employing mooring managers and other seasonally active coastal operators for 7-month restoration programmes during their off-season

6 Key Learnings and Discussion Outcomes

Reference Conditions: A Shared Scientific Challenge

The Q&A session surfaced a key methodological challenge. While reference conditions for Posidonia status (habitat condition) are relatively well established through Water Framework Directive intercalibration, reference conditions for blue carbon stocks and biodiversity enhancement remain largely absent.

> In the ARTEMIS partner site in Greece, measured soil carbon values exceeded all previously recorded values in the country — demonstrating how local variability can render global defaults unusable and underscoring the need for site-specific baselines.

Oscar Serrano recommended a tiered approach (analogous to IPCC Tier 1/2/3) where projects use local site data where available, and published literature defaults where not — with the understanding that lower-certainty claims will be more conservatively penalised in crediting.

Europe's Policy Landscape: Momentum but Gaps

Participants to the discussion raised the issue of the EU Nature Credits Roadmap and the relative invisibility of marine ecosystems within it. Christian Sansoni

confirmed that marine blue carbon is underrepresented in current European expert groups, with most work focused on green carbon (forests, agroecology).

However, a technical working group has been active since January 2026 developing a methodology specific to marine coastal ecosystems. A first framework applicable to European coasts is expected by the end of 2027.

> **Opportunity for ARTEMIS:** the project's four active pilot restoration sites, combined with existing blue carbon and biodiversity measurement data, could contribute directly to the development of this methodology. Follow-up with the EU technical group is recommended to explore data-sharing or formal participation.

Verra Scandal and the Integrity Imperative

Sansoni referenced the 2023 Guardian investigation revealing that 94% of Verra's Amazon and South American forest credits had been substantially overstated — involving companies including Gucci, British American Tobacco, Shell and Chevron, with global investments exceeding $1.5 billion. The scandal resulted from self-certification rather than third-party verification.

Despite initial fears, investment in carbon credits declined by less than 10% following the scandal, as companies moved toward rigorously third-party certified credits. The lesson for ARTEMIS: independent certification is not optional — it is the foundation of any credible market offer.

7 Strategic Priorities and Next Steps for ARTEMIS

Building a Solid Project Pitch: Summary Framework

Understand demand	Identify whether the potential buyer needs to compensate for disturbance, depends directly on healthy seagrass (fisheries, coastal erosion management), or is seeking reputation/recognition. Each rationale requires a different pitch.
Embrace all SDGs	Design projects to maximise SDG alignment and embed both local/traditional knowledge and scientific knowledge (restoration ecology, blue carbon, biodiversity).

Establish reliable metrics	Define metrics and thresholds for habitat condition shifts: reliable, conservative, low-cost, and high-integrity. Balance scientific complexity with operational usability.
Restore at scale	Aggregate sites, share MRV costs, and target ecological impact at scale. Small isolated restoration projects are neither financially viable nor ecologically significant.
Diversify income	Bridge financial gaps by building seagrass opportunities within existing coastal businesses. Do not rely on credit income alone.
Measure by practices	Use practice-based crediting rather than results-based valuation to avoid methodological complexity and improve feasibility.
Communicate with integrity	Build credibility through independent certification, data traceability, and public acknowledgement of uncertainty. Credibility is a competitive asset.

8 Outcomes and Key Learnings from the Session

The session signalled a critical juncture for ARTEMIS: from producing scientific evidence on seagrass ecosystem services to enabling the translation of that evidence into market-ready, credible, and financeable project pitches. This requires moving from a research-and-monitoring paradigm to a project-development paradigm where scientific rigour and financial realism operate together.

Across both presentations and the discussion, a consistent pattern emerged:

- Scientific credibility is a necessary but insufficient condition — it must be combined with certification, communication discipline and business model design
- Financial viability requires stacking nature benefits, not relying on any single credit type
- Scale is the single biggest barrier to impact; aggregation strategies and community-embedded business models are the most promising paths forward
- Communication integrity — transparency about uncertainty, reliance on third-party verification, avoidance of greenwashing — is both a moral obligation and a commercial strategy

- ARTEMIS's pilot restoration data and multi-country network position it well to contribute to the emerging EU methodology for marine blue carbon credits

9 Implications and Next Steps

ARTEMIS should be positioned not only as a scientific initiative, but as a project-development platform that enables partners and pilot sites to translate restoration and conservation into credible, certified, and financially viable nature credit projects.

Priority Actions

- Develop site-specific blue carbon baselines at the four ARTEMIS pilot sites, including absolute markers to track soil carbon flux in both restored and unrestored areas
- Evaluate the feasibility of eDNA as a standardised biodiversity monitoring protocol across ARTEMIS sites, with a view to inclusion in future MRV plans
- Initiate contact with the EU technical working group developing the marine blue carbon methodology to explore data-sharing or formal contribution
- Map existing coastal businesses (mooring operators, fishing cooperatives, tourism operators) in partner areas that could serve as the foundation for integrated restoration business models
- Develop a communication protocol for ARTEMIS based on the three-pillar framework (clarity, evidence-based messaging, transparency on limits), applicable across project deliverables, partner communications and public-facing outputs
- Explore aggregation mechanisms to combine ARTEMIS pilot sites under a shared certification and MRV framework, improving financial viability at scale

Speakers: Dr Oscar Serrano (marine ecologist, blue carbon specialist) · Christian Sansoni (Ecosostenibile.eu, carbon credit startup)

ARTEMIS Peer Learning Session — "What Can We Really Say? From Data to Credible Messages" — 07 May 2026