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EFFECTIVE

PROTECTION AND RESTORATION MANAGEMENT • MEDITERRANEAN MPAs

**Enhancing social well being and economic prosperity
by reinforcing the eFFECTIVENess of protection and
restoration management in Mediterranean MPAs**

D8.2. Designs of the Collaborative spaces

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EXECUTIVE SUMMARY

This Deliverable (D8.2) is part of the EFFECTIVE project - “Enhancing social well-being and economic prosperity by reinforcing the eFFECTIVENess of protection and restoration management in Mediterranean MPAs”. The project is coordinated by Centro Tecnológico Naval (CTN) and other 22 partners from around Europe.

The following report is part of Work Package 8: Citizen and Social engagement and is divided in two main blocks related to Pilot 1 and 2.

In the Task 8.2 (Development of collaborative spaces), Seastainable Ventures (Pilot 1) and Eurecat (Pilot 2) collaborate to create the EFFECTIVE Interpretation Centre as a collaborative space for communication, ocean literacy and educational activities to promote a greater understanding of what citizens can do to protect the health of the oceans and to empower them to make informed and responsible decisions regarding the ocean and its resources. The marine biodiversity monitoring, protection and restoration actions carried out in this project are being co-created and codesigned by the relevant stakeholders to ensure its effectiveness and success in its implementation. Afterwards, the results obtained, are going to be disseminated in this space.

On the one hand, a spatial planning and communication tools such as panels and rollups are being developed for several activities aligned with the EFFECTIVE project, such as the dynamization of the Marina Palamós SEAREGLAB, where several tanks and/or aquariums will be installed where some of the organisms (e.g.; recruits) that will be used for restoration actions in WP4 will be exposed during the relocation and conditioning phase. On the other hand, Eurecat will use their Ebro Bioterritory Living Lab to better involve citizen participation with the project by disseminating it within a well-established network of collaborative projects related with active restoration, climatic assemblies and Nature-based Solutions (Nbs) design.

To sum up, the EFFECTIVE Interpretation Centre and the Living Lab will act as hubs for education, awareness, and community involvement, promoting understanding and active participation in marine ecosystem restoration. The co-creation process ensures that restoration actions are locally relevant, which enhances their effectiveness and sustainability. In the future, these collaborative frameworks can be adapted to other regions, serving as replicable models for advancing ocean literacy and stakeholder-driven restoration actions

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SYMBOLS, ABBREVIATIONS AND ACRONYMS

SV	Seastainable Ventures
CSIC	Consejo Superior de Investigaciones Científicas
OOF	One Ocean Foundation
EBS	Ecosystem-Based Management
EA	Ecosystem Approach
EBMS	Ecosystem-Based Management System
MPA	Marine Protected Area

1.1. Introduction of Collaborative spaces

The Collaborative Spaces activity aims to establish the EFFECTIVE Interpretation Centre as a dynamic, collaborative space designed to foster ocean literacy, public engagement, and community-driven action. Led by SV and Eurecat, in collaboration with local authorities such as the Port of L'Estartit and Port Marina Palamós, the Estartit Council (Pilot 1), and La Ràpita Council (Pilot 2), these centres will serve as hubs for co-creating and co-designing marine biodiversity monitoring, protection, and restoration efforts. The space will also facilitate the dissemination of project outcomes through interactive exhibits, including aquariums displaying key marine organisms involved in restoration actions. Integrated with the Blue Parks Digital Twin and supported by Eurecat's Ebro Delta Living Lab, the initiative seeks to empower citizens with knowledge and tools to make informed, responsible decisions for the health of the ocean.

Pilot 1. "ESPAI MEDES" and SEAREGLAB

In April 2025, it has recently been inaugurated the **Espai Medes** located in L'Estartit, promoted by the Torroella de Montgrí Town council, this modern facility is dedicated to raising awareness about the ecological and cultural importance of the Montgrí, Medes Islands and Baix Ter Natural Park. The centre features an immersive exhibition space with interactive displays, audiovisual installations, and educational panels that offer a comprehensive insight into the unique marine and terrestrial ecosystems of the area. It also includes spaces for workshops, educational activities, and public engagement events, making it an ideal venue for outreach, training sessions, or project-related meetings. The Medes Centre serves both as a hub for environmental education and a platform to promote sustainable conservation initiatives.

Thanks to the collaboration of the Effective consortium members CSIC, Seastainable Ventures and Ocean Ecostructures with the Espai Medes' promoters with its flexible layout and multipurpose rooms, *Espai Medes* is ideally suited for hosting meetings, training sessions, outreach events, or any other activities aligned with the goals of the EFFECTIVE project, so far this space is now available to support any activities developed within the framework of the project.

Additionally, Ocean Ecostructures has implemented its first Marina Palamós SEAREGLab. The specific objectives of the initiative include: (1) Education, awareness, and the promotion of science, aiming to enhance public understanding of marine ecosystems, highlight the importance of their conservation, and inspire younger generations to engage with marine biology through a deeper connection with the ocean environment; (2) Dissemination of research, by sharing project developments with the wider public to foster transparency and knowledge exchange; and (3) Skills development, offering hands-on learning opportunities in laboratory techniques, sampling, and data analysis to support capacity building and scientific literacy. This modular laboratory is equipped with five aquariums dedicated to the cultivation of various marine species. These experimental centre focuses on regenerating marine life through the pre-planting of species on plates. The initiative has been promoted by Port Marina Palamós in collaboration with Ocean Ecostructures, which is responsible for managing all operational activities and will also use the facility as a research and innovation platform. Additionally, it serves as an educational tool aimed at raising awareness within the community.

Within this framework, the SEAREGLab will be used both for experimental trials—such as testing the colonisation of artificial substrates and the growth of key marine species—and for educational and outreach activities to raise public awareness about marine regeneration. The facility will thus play a

dual role: advancing scientific research and fostering community engagement in line with the goals of the EFFECTIVE project.



Figure 1. SEAREGLAB - Ocean Ecostructures' research laboratory located at Marina Port de Palamós.



Figure 2. Aquariums inside the SEAREG Lab, used for research and monitoring of marine biodiversity and regenerative technologies.

Pilot 2. Ebro Bioterritory Living Lab

The Ebro Bioterritory Living Lab, promoted by Eurecat through the [Climate Resilience Centre \(CRC\)](#) in Amposta (Spain), is a creative space for social and collaborative innovation. In this participatory space, we aim at promoting an alternative model for the holistic management of the Ebro Delta, a region facing significant climate challenges such as coastal regression, subsidence, salinization, water stress and biodiversity loss. The Ebro Bioterritory Living Lab facilitates applied research through participatory tools to develop a new sustainable territorial model by engaging various stakeholders in co-creating solutions that address the Ebro Delta's resilience and sustainability. In addition, this Living Lab facilitates co-creation of nature-based solutions for restoring and conserving ecosystems and climate resilience in the Ebro Delta integrating sectors such as agriculture, tourism, fishers and aquaculture.

The Living Lab methodology, an innovative approach for collaboration and bottom-up participation is considered this space. To do so, the Ebro Bioterritory Living Lab team enable and implement mechanisms to achieve consensus among stakeholders involved in the just social and ecological transition, ensuring that diverse voices contribute to decision-making processes. Therefore, it is a

space for participatory innovation, influencing policies by demonstrating effective sustainability practices and fostering transformative territorial change.

By integrating research, governance, and citizen participation, the Ebro Bioterritory Living Lab plays a pivotal role in ecosystem restoration projects, fostering a collaborative approach to environmental resilience. On the one hand, in collaboration with the [CLIMAS](#) project, the Ebro Bioterritory Living Lab co-created a citizen science toolkit designed for climate assemblies of Catalonia, enhancing their involvement in climate adaptation strategies. This toolkit enables citizens to engage in climate adaptation discussions, enhancing their understanding and involvement. In addition, within the framework of the [BIORESILMED](#) project, the Ebro Bioterritory Living Laboratory promotes co-design among socioeconomic stakeholders to create new business models that leverage the restoration of natural heritage, boost bioeconomy and improve climate resilience in Mediterranean landscapes. On the other hand, the Ebro Bioterritory Living Lab facilitated, through the [REST-COAST](#) project, the creation of the COastal REStoration PLATform (CORE-PLAT) of the Ebro Delta, which was designed by a multi-level approach of collaborating and decision-making. The CORE-PLAT is a governance instrument and a restoration enabler engaging stakeholders on co-designing and co-implementing hands-on coastal restoration for its long-term maintenance and upscaling. Through this governance instrument and considering their common objectives, synergies between the European projects EFFECTIVE and REST-COAST were initiated to maximize the ecological and socio-economic benefits of coastal and marine restoration and unite efforts in stakeholder engagement.

Within the framework of the EFFECTIVE project, based on experience in the initiatives and projects described above, the Ebro Bioterritory Living Lab aims, on the one hand, to be an instrument for co-designing restoration actions and replicable and scalable solutions for the socioeconomic challenges faced by the Ebro Delta derived from the impacts of global and climate change; and on the other hand, it aims to be a collaborative space to promote ocean literacy and educate citizens on protecting ocean health, empowering them to make informed decisions about marine ecosystems and resources.

1.2. Designs of Collaborative spaces

As part of the EFFECTIVE project, Collab Spaces have been designed and implemented in distinct pilot areas: Mar de l'Empordà and the Ebro Delta. These collaborative spaces—namely Espai Medes, Marina Palamós SEAREGLab, and the Ebro Bioterritory Living Lab—serve as key hubs for carrying out both scientific and outreach activities aligned with the project's goals. Their purpose is to foster citizen engagement, promote ocean literacy, and support the monitoring, protection, and restoration of marine biodiversity through nature-based solutions (NbS).

The methodology applied in these two pilots has been adapted to the specific local context of each site, with the intention of making it replicable in other regions. To support communication efforts, visual and educational materials have been co-designed with project partner F6S (Figure 3 and Annex). These include graphic panels placed at each Collab Space, providing information about the EFFECTIVE project, the local pilot actions, and the implementing partners, while explaining the NbS to be deployed in each case.

Furthermore, these materials feature QR codes linked to the COSEA app, encouraging community involvement and enhancing citizen science participation within the project framework.

Pilot 1. “ESPAI MEDES” and SEAREGLAB



Figure 3. Informational panel designed by F6S for the Espai Medes Collab Space, featuring content about the EFFECTIVE project, local pilot actions, and implemented NbS, including QR codes for public interaction via the COSEA app.

Pilot 2. Ebro Bioterritory Living Lab

Based on the graphic material designed by the project partners in collaboration with Ocean Ecostructures, it will be used as the basis for replication in Pilot 2. The murals that illustrate the overall Effective project will remain largely the same in all cases, with adaptations to reflect the specific information about each pilot. In this case, the content will focus on Pilot 2 and the restoration actions to be implemented there. Additionally, the third mural panel will include information about Eurecat, highlighting its contribution to the project.

Once the final version of the material for Pilot 1 is completed, it will be adapted and replicated for Pilot 2.

1.3. Design and implementation of specific Workshops

The EFFECTIVE project aims to protect and restore the EU's Mediterranean Blue Natural Capital by developing comprehensive scientific knowledge and practical guidance for ecosystem-based management. A key component of this initiative is the establishment of the EFFECTIVE Interpretation Centre, based on the collaboration between Pilot 1 and Pilot 2, and conceived as a collaborative space for communication, ocean literacy, and educational activities.

Through employing participatory workshops, we will ensure the co-creation of a user-centered EFFECTIVE Interpretation Centre. Using a collaborative approach, based in the Ebre Bioterritory Living Lab methodology, we want to integrate the diversity of values, perspectives and needs of the end-user community. The main scope is to improve the knowledge uptake and the ocean literacy for the active involvement of the society in marine conservation. Similarly, the Ebre Bioterritory Living Lab will carry out a participatory workshop with aquaculture students in the Pilot 2, in Ebro Delta Bays. We will involve new generations to understand and contribute to the restoration intervention proposed in the *Els Alfacs* Bay. The main goal is to foster the sense of ownership and responsibility for the long-term success of ecosystem-based management and restoration interventions in the Pilot 2. Both activities are key to ensure the literacy, ownership and legitimation of both' EFFECTIVE Pilots' actions towards the conservation of the vital marine ecosystems.

Pilot 1. “ESPAI MEDES” and “Marina Palamós SEAREGLAB”

Workshop ‘Interpretive Itinerary - Co-Designing the EFFECTIVE Interpretation Centre’

To ensure that EFFECTIVE Interpretation Centre effectively fulfils its purpose, a participatory co-design process involving local stakeholders is proposed. The aim of this workshop is to engage citizens and stakeholders - including local community members, educators, students, fishers, the nautical sector, conservationists, environmental NGOs, MPA managers and policymakers - in a collaborative process to co-design the content, spatial layout, and materials of the EFFECTIVE Interpretive Center. Employing the Living Lab methodology, the workshop will be conducted in a real-life setting. The workshop will consist of different phases of participatory work:

1. Immersion and exploration: participants will take a guided tour of the proposed Interpretation Center site (Pilot 1) and its surrounding marine and coastal environments. This immersive experience seeks to deepen their understanding of the local ecosystem, the challenges it faces, the role of Marine Protected Areas (MPAs), and the importance of marine conservation and restoration initiatives.

2. Ideation phase: Following the exploration phase, participants will engage in a facilitated brainstorming dynamic. The main idea is to collectively share insights, ideas, and aspirations for the design of the EFFECTIVE Interpretation Centre. This session will encourage the ideation on topics such as educational content, interactive exhibits, spatial organization, and community engagement strategies. The main question will be the following: How can the EFFECTIVE Interpretation Centre leverage information and format to create a truly immersive experience that effectively communicates the importance of protecting and restoring coastal and marine ecosystems?

3. Prototyping and feedback: based on the ideas generated, participants will work in groups, and they will select two of their key ideas to develop into more detailed prototypes or proposals for the interpretive centre. Participants will analyse different aspects of the interpretation centre: spatial characteristics, educational content, immersive experience, community engagement, among other. These prototypes/proposals will be presented to the group for feedback, which will foster iterative refinement and collective ownership of the design results.

4. Consolidation and action planning: the final phase of the workshop involves synthesizing the ideas of the various groups into a coherent design proposal for the EFFECTIVE Interpretation Center. An action plan will be collaboratively developed outlining the next steps for implementation, including potential roles for participants and timelines.

The following outcomes are expected from this workshop: 1) concrete proposals for the design of the EFFECTIVE Interpretation Center that integrate diversity of perspectives, values and needs towards an immersive experience; 2) to improve ocean literacy among participants, empowering them to participate in the decisions about marine conservation and restoration efforts and priorities; and 3) strengthen relationships among local stakeholders, despite their diverse interests, fostering ongoing collaboration in the management and promotion of the centre.

By designing the EFFECTIVE Interpretation Centre in a participatory and co-design process based on the Living Lab methodology, the EFFECTIVE project ensures that the interpretation centre is a dynamic, user-centred space that effectively promotes an immersive experience to enhance awareness of marine conservation and restoration efforts.

Workshop: Expert Knowledge Gathering for Marine Environmental Management Espai Medes – L'Estartit (Catalonia), July 2025

As part of the activities of the EFFECTIVE project aligned with WP2 and WP3 about Ecosystem Based Management System (EBMS) a scientific workshop will be held at Espai Medes on 2th July 2025, focused on gathering expert knowledge to support the design of the EBMS for marine areas.

This workshop aims to bring together professionals and researchers in the field of marine ecology, management of marine protected areas (MPAs), ecosystem services, and blue economy. The objectives are:

- To identify relevant pressures and their ecological effects in Mediterranean MPAs.
- To prioritize ecosystem services and the values that should be maintained or enhanced through management actions.
- To contribute to the development of indicators for assessing Good Environmental Status (GES) under the EBMS framework.
- To generate useful knowledge for the formulation of adaptive, science-based marine management strategies.

This event is supported by the EFFECTIVE project partners and is aligned with pilot actions being carried out in Catalonia, particularly in the area of the Montgrí, Medes Islands and Baix Ter Natural Park. It will include discussion sessions and participatory dynamics, integrating local and scientific knowledge in a co-creation process.

In the session, it will participate several scientific members with expertise in the 11 descriptors which define the Good Environmental Status and also the Directors of both Natural Parks of the pilot 1.

Each Descriptor will have at least 2 experts except for Descriptor 1, Biodiversity, where will have representatives from the biological groups most represented in Marine Strategies (birds, cetaceans, fish, and habitats).

The following table includes the list of Pilot 1 experts:

During the workshop, it will be discussions about how to achieve and maintain the ideal state, as well as conduct a pressure exercise and present preliminary results of previous work on identifying and prioritizing ecosystem services.

Pilot 2. Ebro Bioterritory Living Lab

The Ebro Bioterritory Living lab as a facilitator of synergies between projects

Synergies between the EFFECTIVE project and the European project [RESTCOAST](#) were initiated to maximize the ecological and socioeconomic benefits of coastal and marine restoration and to combine efforts in stakeholder engagement. The Ebro Bioterritory Living Lab facilitated, through the REST-COAST project, the creation of the COastal REStoration PLATform (CORE-PLAT) of the Ebro Delta, which was designed by a multi-level approach of collaborating and decision-making.

The Ebro Delta CORE-PLAT is a governance instrument and a restoration enabler engaging stakeholders on co-designing and co-implementing hands-on coastal restoration for its long-term maintenance and upscaling. Through this governance instrument and considering their common objectives, synergies between the European projects EFFECTIVE and REST-COAST were proposed at the CORE-PLAT meeting of the REST-COAST project, held on October 3rd, 2024, with key stakeholders of the Ebro Delta region.



Figure 4. CORE-PLAT meeting of the REST-COAST project where synergies between EFFECTIVE and REST-COAST projects were proposed.

Workshop ‘Restoring Ebro Delta Bays – A collaborative journey’

EURECAT proposes the following participatory activity designed to engage students from a local aquaculture school ([IEPAAC](#)) of the Pilot 2 in disseminating and contributing to the EFFECTIVE project’s restoration efforts in the Ebro Delta Bays.

This workshop aims to engage aquaculture students in understanding and disseminating the restoration efforts of the EFFECTIVE Pilot 2 project in the Ebro Delta Bays, fostering practical knowledge about marine ecosystem restoration and encouraging their participation in the initiative. This workshop aims to encourage discussion among students on the challenges and solutions for nature restoration in the context of the Ebro Delta Bays. In addition, they will learn about the importance of Marine Protected Areas in these environments, having the conservation of the natural heritage at the scope within the territory they belong to.

The workshop will consist of the following parts:

1. Introduction. Presentation of the EFFECTIVE project, focusing on Pilot 2’s goals, such as improving water quality and habitats recovery in the Ebro Delta Bays. The following main themes could be

highlighted: the importance of Marine Protected Areas, the development of nature-based solutions for the management and restoration of coastal and marine ecosystems, and the challenges faced by the Ebro Delta Bays due to the impacts of socioeconomic activities and climate change.

2. Field visit to the restoration site (pending confirmation according to IEPAAC availability). Discussion of the socioeconomic activities in the Ebro Delta Bays, important coastal habitats, environmental challenges, vulnerabilities to climate change, and the restoration solutions proposed in the EFFECTIVE project. The students collect basic observations of the restoration site, and they interact with the project's interactive Citizen Science App (COSEA app). Using the COSEA app, the students will become familiar with the mechanisms of citizen science and its relevance for monitoring, establishing a possible tracking system for the current and further restoration actions in the bay.

3. Interactive dynamics. A brainstorming session will be held on how the restoration action could be improved, from a youth perspective to maximize the impact of the ongoing restoration efforts of the Pilot 2 and considering their replicability and upscaling along the Ebro Delta Bays and beyond.

The workshop, through participatory methodologies, will foster the generation of ideas to improve restoration actions, incorporating the perspective of young people linked to the Delta's bay ecosystems. Priority will be given to the discussion and proposal of actions to incorporate the diversity of perspectives and concretize proposals for the potential scalability of the restoration measure. The activity will raise awareness among students about the importance of ecosystem restoration and their role as future professionals, promoting a culture of active participation in the protection of the Ebro Delta's environment.

NEXT STEPS

During the upcoming months, the Collaborative Spaces task will focus on implementing the key workshops and activities outlined in the EFFECTIVE roadmap. These actions will ensure that the collaborative spaces transition from their design phase into fully functional hubs for stakeholder engagement, ocean literacy and restoration co-creation.

The immediate next steps, as seen in Figure 5, include:

Scientific Workshop on Marine Environmental Management (July 2025, Espai Medes)
Experts in marine ecology, MPA governance and ecosystem services will convene to support the development of the Ecosystem-Based Management System (EBMS). Their input will contribute to defining key pressures, values and indicators for Mediterranean MPAs.

Co-Design Workshop for the Interpretation Centre (July 2025, Espai Medes)
Local stakeholders will be engaged through participatory methodologies to finalise the layout, content and functionalities of the EFFECTIVE Interpretation Centre. This workshop will ensure that the space responds to community needs and promotes inclusive ocean literacy.

Aquaculture Students Workshop (July 2025, Amposta / Ebro Delta)
Young students from the aquaculture sector will participate in a hands-on workshop to understand and reflect on the restoration actions in the Ebro Delta Bays, encouraging awareness, responsibility, and intergenerational engagement in marine conservation.

Looking further ahead, a key focus will be placed on:

Scalability and replication:

The insights and methodologies developed through Pilots 1 and 2 will inform a broader strategy to adapt and transfer the collaborative space model to other Mediterranean coastal regions. This includes building on synergies with existing initiatives such as CORE-PLAT and the Digital Twin framework, particularly in relation to citizen science.

These steps will consolidate the collaborative spaces as essential pillars for stakeholder engagement, education, and restoration efforts within the EFFECTIVE project and beyond.

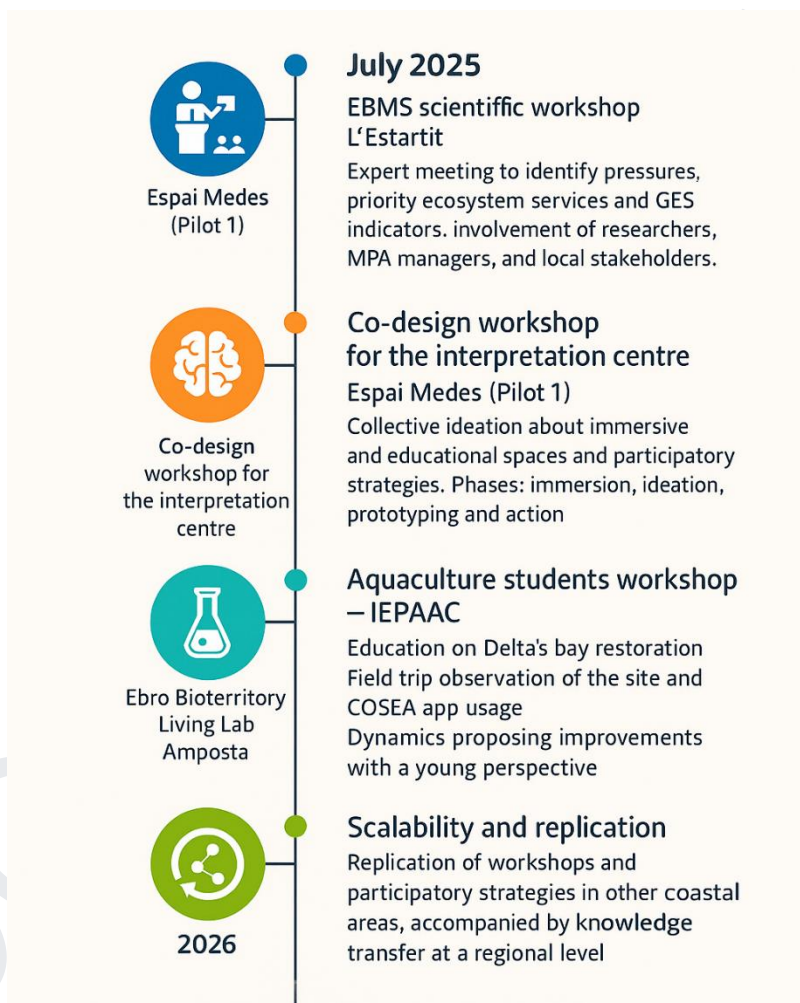


Figure 5. Timeline illustrating upcoming workshops and activities related to the Collaborative Spaces task within the EFFECTIVE project, including key milestones and engagement events.

Ocean Ecostructures

Ocean Ecostructures és una empresa Bluetech fundada el 2018 a Barcelona, especialitzada en oferir solucions multitecnològiques per a la renaturalització marina en infraestructures humanes. La seva principal activitat contribueix a compensar l'impacte de les activitats antropogèniques als oceans i a recuperar els espais degradats com ports, marines, plataformes offshore i cables submarins. L'objectiu és transformar aquests espais grisos en oasis blaus, tot promovent la biodiversitat i la recuperació de la funcionalitat ecològica dels ecosistemes marins.

Ocean Ecostructures ha desenvolupat una tecnologia pionera, les LifeBoosting® Units (LBUs), uns microscullis biomimètics que imiten les funcions ecològiques dels esculls naturals per afavorir la biodiversitat i la recuperació marina. Aquestes estructures ajuden a establir un nou estat estable on l'ecosistema recupera la seva funcionalitat i es torna més resilient. Les LBUs estan fetes de carbonat càlcic, similar als esquelets de corall, i incorporen una mescla patentada LifeBoostingMix®, que facilita la colonització per microfauna i larves, impulsant la renaturalització dels espais marins.

A través d'un robust sistema de monitorització, on es fan servir tecnologies avançades mitjançant ROVs, sondes multiparamètriques i sensors. Aquests dispositius permeten recopilar dades sobre diversitat, biomassa, qualitat de l'aigua, absorció de CO₂, entre d'altres, proporcionant una visió detallada de l'evolució de l'ecosistema i de l'impacte positiu dels LBUs.

Tota la informació recollida s'emmagatzema a la plataforma iOceans, un espai digital accessible per als clients, on poden consultar tendències històriques, analitzar models predictius i avaluar l'impacte ambiental dels LBUs implementats, cosa que permet una presa de decisions basada en dades reals.

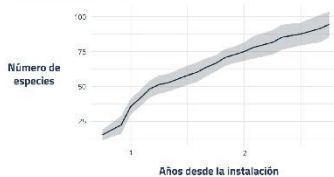
A més de garantir transparència, iOceans permet als usuaris actuar proactivament per maximitzar el seu impacte positiu en el medi marí. Aquesta plataforma es complementa amb l'APP d'Ocean Ecostructures, que fomenta la participació activa dels agents implicats en regeneració marina, facilitant la implicació social i assegurant una gestió ecològica més efectiva.

Amb aquestes tecnologies avançades i coneixement científic, Ocean Ecostructures ajuda les empreses a regenerar el medi marí a fer créixer els seus impactes positius. Treballen amb estàndards globals per integrar la natura dins l'estratègia empresarial i sumar aliats pel futur del planeta blau.



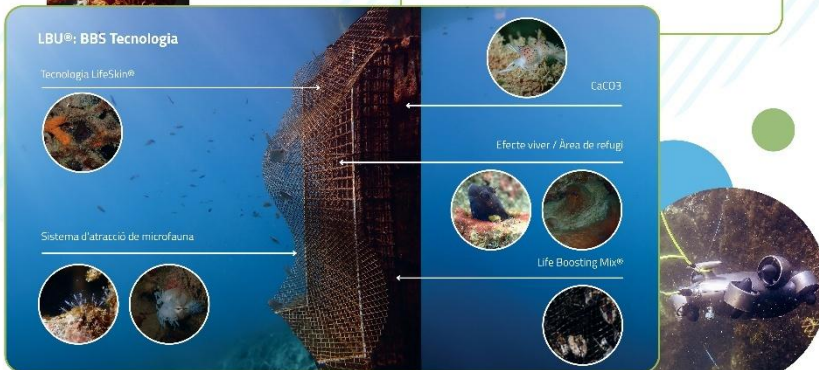
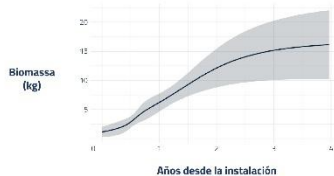
Riqueza de especies acumulada por LBU

Intervalo de confianza del 95%



Modelo predictivo de la biomasa por LBU

Intervalo de confianza del 95%



El projecte EFFECTIVE implementa solucions basades en la natura (NBS) en quatre àrees marines protegides del Mediterrani: Mar de l'Empordà (Mediterrani Occidental), Delta de l'Ebre (Mediterrani Occidental), Sardenya Septentrional (Mediterrani Central-Occidental) i Cavo Greco (Mediterrani Oriental).

El projecte analitza la seva extensió i evolució per optimitzar la conservació. A més, tres d'aquestes àrees estan interconnectades mitjançant el Corredor de Migració de Cetacs i el Santuan Pelagos, espais fonamentals per a la biodiversitat marina. Aquesta connectivitat ecològica és essencial per a la protecció de les espècies en perill, ja que permet la migració i interacció entre les diferents àrees.

Pilot 1 Mar de l'Empordà

El Mar de l'Empordà és una zona d'especial protecció que comprèn diversos parcs naturals, com el Montgrí, el Baix Ter i les Illes Medes, que alberguen una gran diversitat d'espècies marines d'alt valor ecològic. Aquest ecosistema acull espècies emblemàtiques com el corall vermell (*Corallium rubrum*), les gorgònies (*Paramuricea clavata*), les praderies de *Posidonia oceanica* i *Cymodocea nodosa*, així com el cavallet de mar (*Hippocampus hippocampus*), el llagostí europeu espinós (*Palinurus elephas*), el mero (*Lepinephelus marginatus*), la nacre (*Pincta nobilis*), la gamba roja (*Aristeus antennatus*) i la comunitat general de peixos.

Aquesta zona també és un lloc destacat per a activitats recreatives com el submarinisme, que permet explorar de manera respectuosa els seus fons marins, així com els esports aquàtics i la pesca artesanal regulada. La gestió sostenible d'aquest espai busca equilibrar la conservació de la biodiversitat, integrant les bases de l'EBMS (Sistema de Gestió Basada en els Ecosistemes) mitjançant la ciència, el compromís social i la ciència ciutadana, així com la participació de les parts interessades i les directrius governamentals per a la presa de decisions.

En el marc del projecte EFFECTIVE, Ocean Ecostructures està portant a terme accions de renovació d'infraestructures marines a la primera àrea pilot del projecte, el Mar de l'Empordà. Concretament, les accions es realitzen al punt estratègic del Club Nàutic Port de l'Estartit, una zona crucial per a la restauració d'ecosistemes marins. OE contribueix de manera significativa al pilar informatiu del projecte, liderant el paquet de treball 4: Accions de Restauració Marina mitjançant Solucions Tecnològiques Basades en la Natura.



En aquest context, OE aplica la seva tecnologia innovadora, que es desplegarà a través de diferents solucions clau:

- 1 **25 Life Boosting Units (LBU):** Microesculls biomimètics dissenyats per a l'atracció de la biodiversitat marina en entorns portuaris.
- 2 **Escull biomimètic a gran escala:** Instal·lació d'un gran sistema de restabliment ecològic en una zona estratègica per a la renovació d'ecosistemes portuaris.
- 3 **Àrea control a Cala Calella:** un entorn natural proper, on també es col·locaran LBUs per analitzar les diferències en la regeneració.
- 4 **Ús de tècniques de preembra:** Ocean Ecostructures col·labora estretament amb científics del CSIC, experts en *Posidonia oceanica* (IMEDEA), gorgònies (ICM) i macroalgues (CEAB). Aquesta col·laboració té com a objectiu el desenvolupament de tècniques de preembrat de espècies en entorns controlats, així com la seva replantació en entorns naturals. Les espècies amb alta importància ecològica, com la *P. oceanica*, es planten en ambients degradats al Mediterrani, en particular als Life Boosting Units (LBU), amb l'objectiu de restaurar la biodiversitat marina en aquests ecosistemes degradats.

Aquest projecte és una gran oportunitat per recuperar els hàbitats marins, unit ciència, innovació i compromís social per preservar la biodiversitat i la riquesa del Mar de l'Empordà.



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