

ORGANIZATION / INITIATIVE LEAD

Ocean Ecostructures S.L. — Barcelona-based BlueTech company specialising in marine ecosystem regeneration through biomimetic infrastructure, ecological engineering and AI-supported environmental monitoring.

TECHNICAL SOLUTION NAME

Bio Boosting System (BBS) and Life Boosting Units (LBUs)

HIGHLIGHT TITLE

Transforming ports and offshore infrastructure into living marine ecosystems through biomimetic engineering, ecological restoration and digital environmental monitoring.

SHORT DESCRIPTION

Ocean Ecostructures transforms artificial marine infrastructure into habitats that support biodiversity and ecosystem recovery. Its Bio Boosting System combines biomimetic Life Boosting Units, specially engineered materials and AI-supported monitoring. Designed for ports, marinas and offshore installations, it brings ecological regeneration to heavily modified environments while remaining compatible with their economic activity.

EXTENDED DESCRIPTION

Ports, breakwaters and offshore structures occupy extensive marine areas, yet their design often provides limited opportunities for biodiversity. Ocean Ecostructures addresses this challenge by integrating habitat-forming structures into existing infrastructure, focusing on degraded environments where restoring ecosystems such as mangroves or seagrass meadows may not be feasible.

Its Bio Boosting System (BBS) combines Life Boosting Units (LBUs)—modular structures that mimic the complexity of natural reefs—with specially engineered materials that encourage biological colonisation. These units create shelter and surfaces where marine organisms can establish themselves, helping artificial structures support more diverse ecological communities.

Environmental monitoring uses underwater remotely operated vehicles, sensors and artificial intelligence to track ecological development. Scientific assessments and six-monthly reports help operators understand changes in biodiversity, biomass and habitat complexity, while supporting the early detection of invasive species.

The solution prioritises biodiversity recovery and ecosystem functions. Climate mitigation is a potential co-benefit of biomass growth and ecological recovery, rather than its primary purpose. Deployed across more than 40 ports and marinas, according to the supplied information, the system combines ecological engineering with environmental data to bring biodiversity into marine infrastructure management.



DEMONSTRATED METRICS

- 150–300% increase in biodiversity reported at several monitored installations
- Deployment across 40+ ports and marinas
- Scientific monitoring and environmental reports every six months
- Monitoring of marine biomass and ecosystem development
- Digital monitoring to support early detection of invasive species

REAL IMPACT

Ocean Ecostructures demonstrates how existing marine infrastructure can support ecological regeneration while maintaining port and industrial operations. Its installations create habitats on artificial surfaces, helping marine communities develop in heavily modified environments.

The combination of habitat creation and scientific monitoring allows infrastructure operators to track ecological change and incorporate biodiversity into asset management. Environmental reporting also supports transparency and corporate sustainability strategies.

Its broader contribution is to make ecological recovery part of the role of ports and offshore infrastructure, connecting economic activity with biodiversity conservation and marine ecosystem resilience.

IMPLEMENTATION LOCATION & DATE

Developed in Barcelona, Spain, and deployed across 40+ ports and marinas, including Barcelona, Algeciras, Palma and Puerto Banús. Additional applications include offshore energy infrastructure in Belgium and Denmark, with ongoing deployments in the Red Sea and the western United States. Initial implementation date not specified.

TECH LEVEL

Medium Tech

MAIN CATEGORY

Primary: Blue Economy**Secondary:** Energy & Environment

COST OF THE SOLUTION

MEDIUM. Requires specialised ecological engineering, installation and monitoring. Modular deployment allows progressive integration into existing marine infrastructure. No specific cost figures provided.

BASE INFORMATION SOURCES

[Ocean Ecostructures — Official website](#)

MITIGATION / ADAPTATION

Adaptation