PIANC French Section

PIANC Mediterranean Days

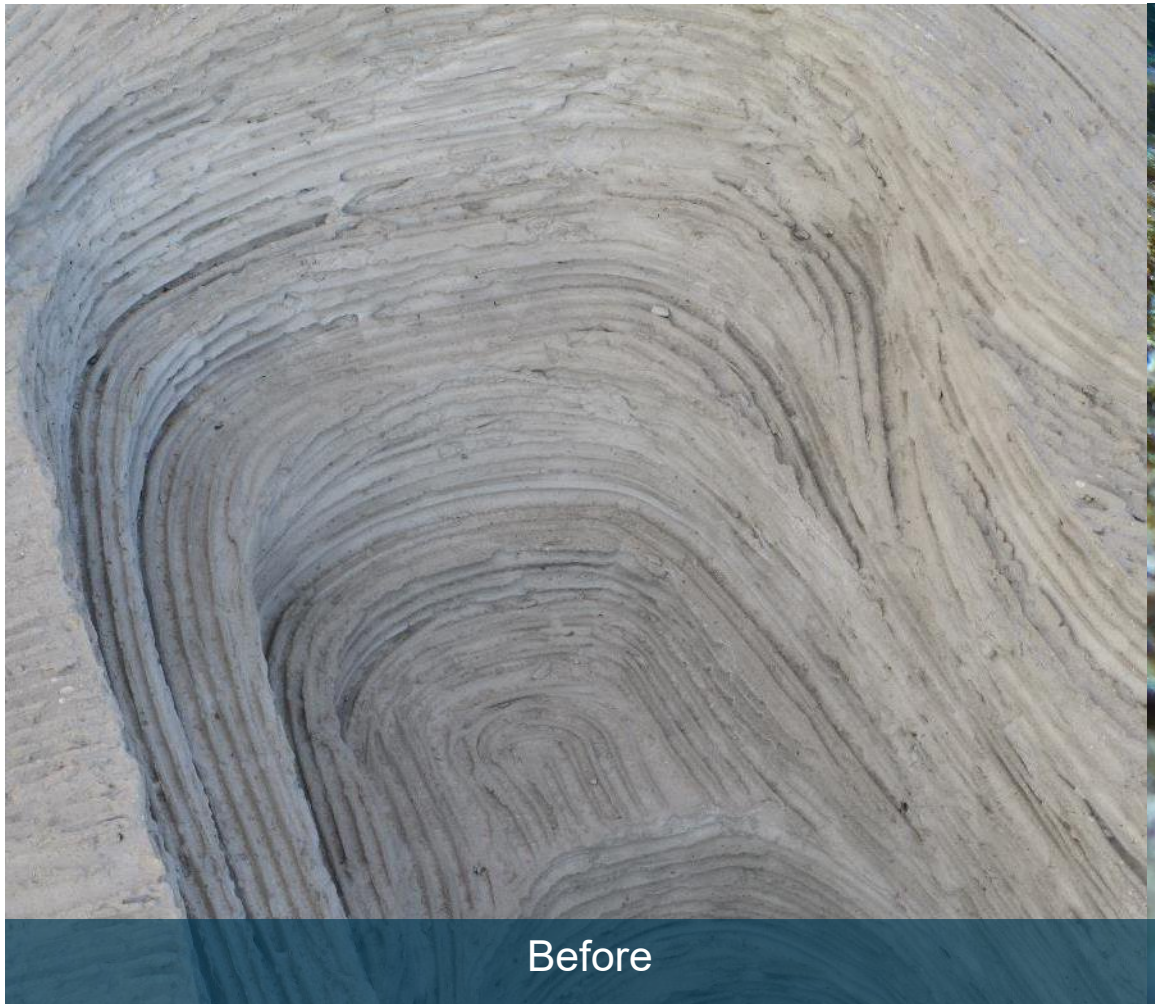
and Conference «Port of the future» by Cerema

25 to 27 october 2023 in Sete France

Nature Inclusive Port Infrastructure

Phil LeBlanc: ECOncrete

Nature Inclusive Infrastructure



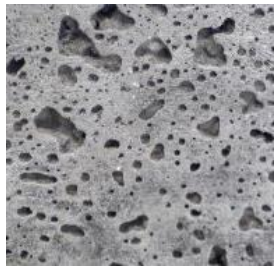
Before

12 Months After Installation

ECONCRETE

Bio-enhancing Concrete Technology

+



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Material composition

Enhance biological recruitment

Surface complexity

Supports marine life settlement

Nature-Inclusive design

Facilitates growth and survival

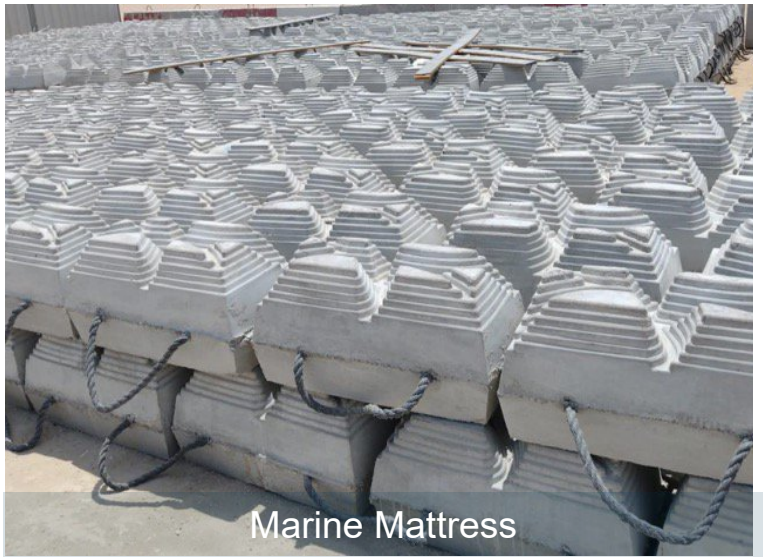
ECONCRETE

New designs

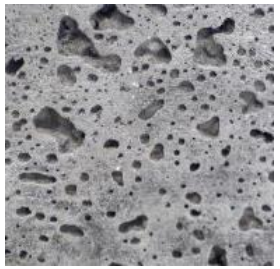
Bio-Enhancing Concrete Technology

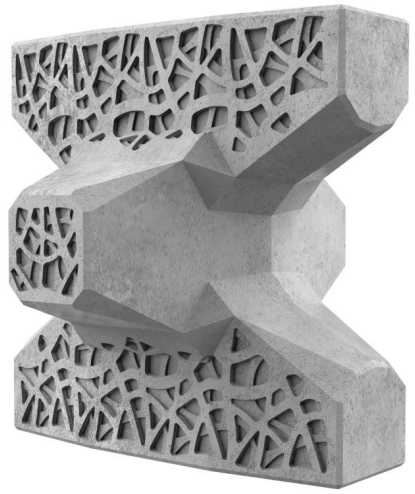
Existing design

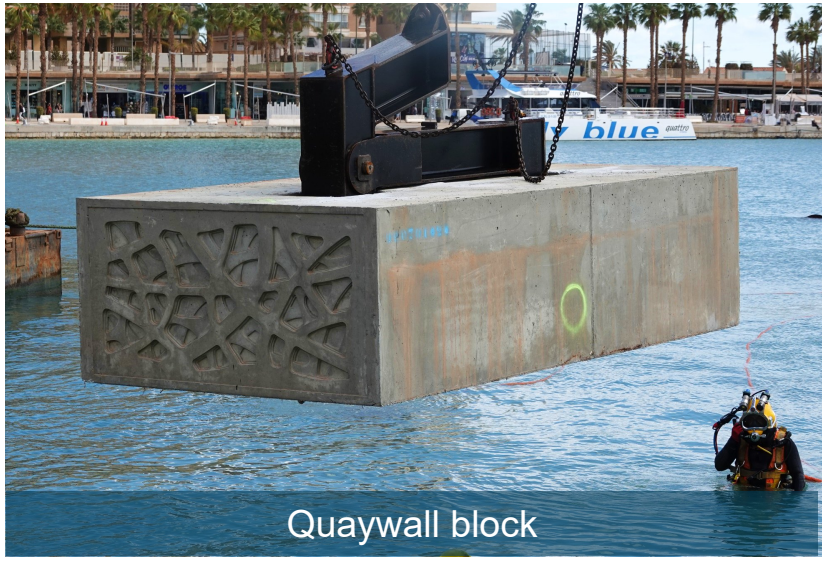
Armor block (Coastalock)



Marine Mattress







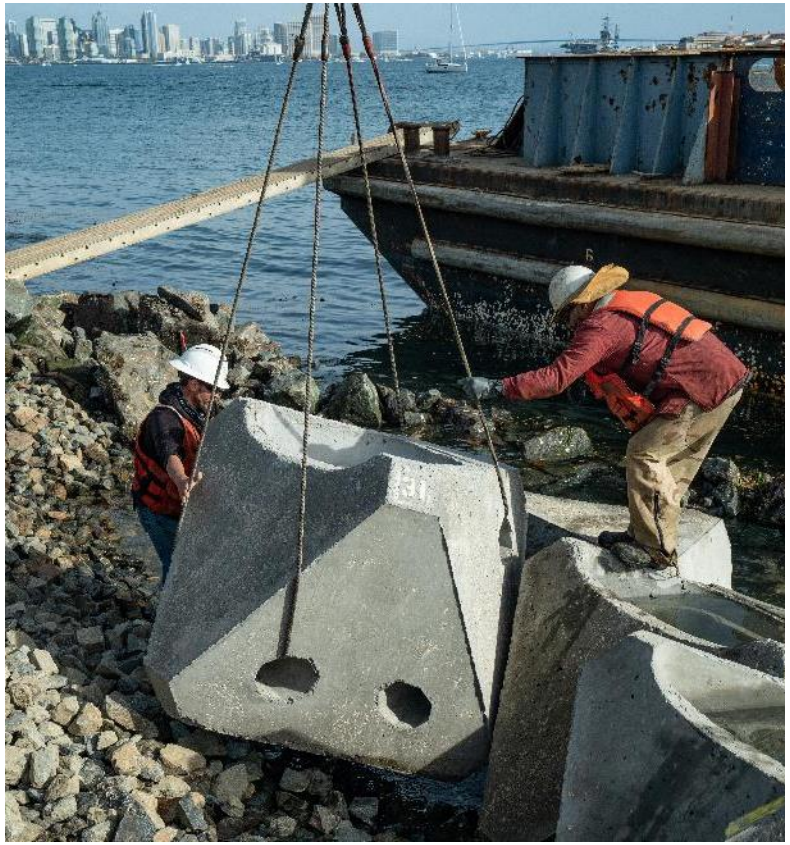
Quaywall block

Port of San Diego

Ecological Enhancement of Shoreline Revetment

2021 Harbor Island, Port of San Diego, USA

PORT of SAN DIEGO Waterfront Development



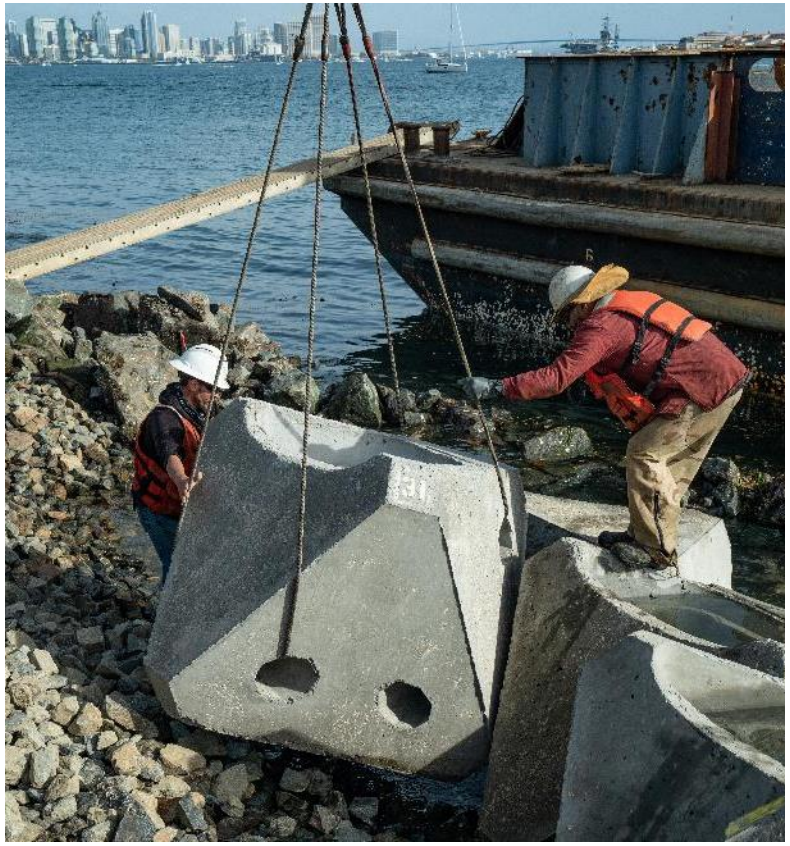
ECONCRETE

Port of San Diego

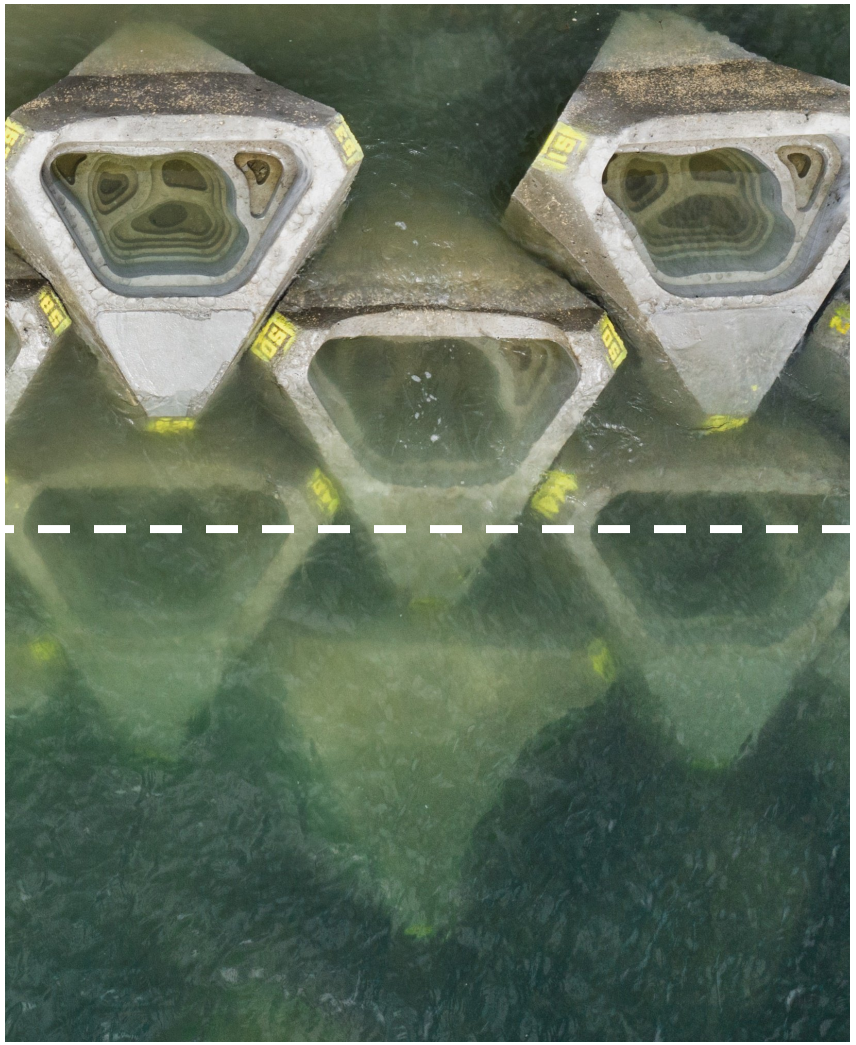
Ecological Enhancement of Shoreline Revetment

2021 Harbor Island, Port of San Diego, USA

PORT of SAN DIEGO Waterfront Development



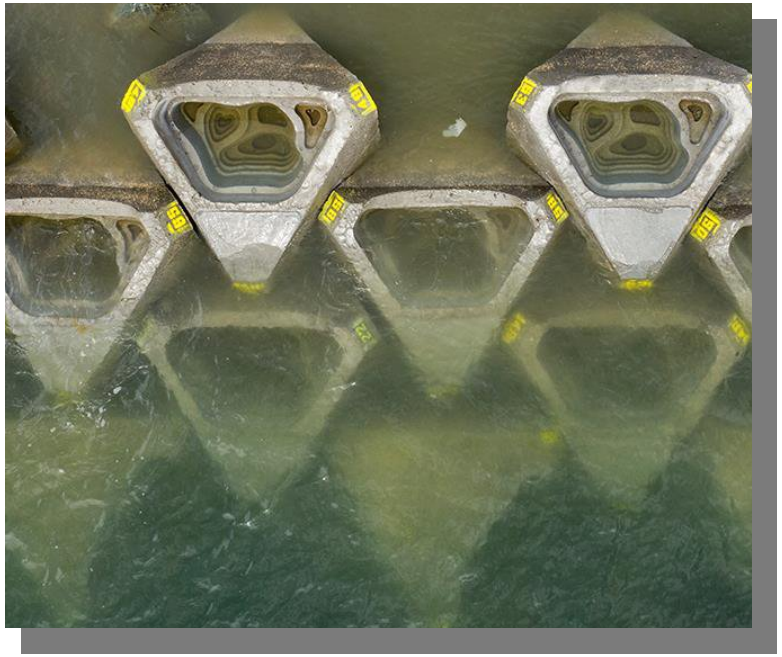
ECONCRETE



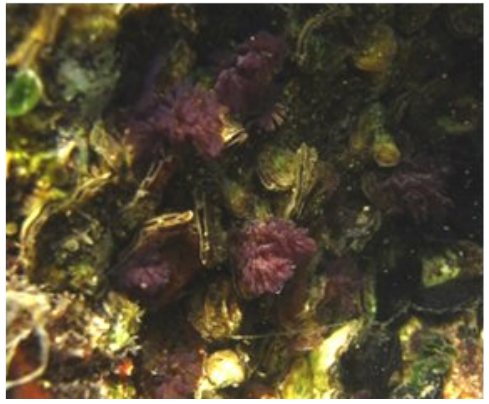
Intertidal
rows
Tide Pool

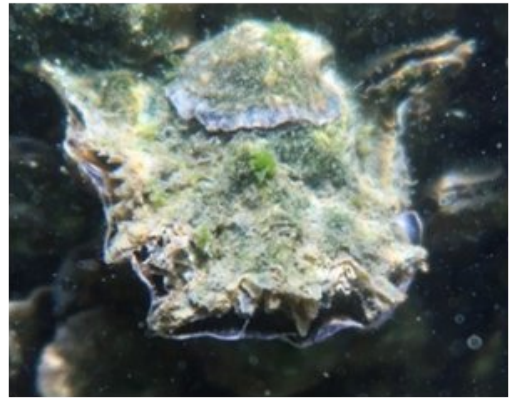
Submerged
rows
Cavity

Before

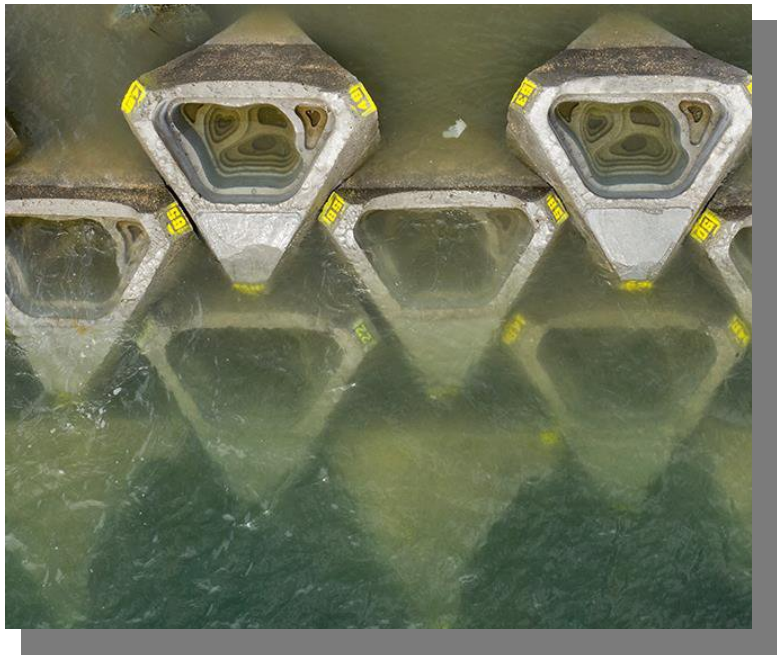


15 Month Post Deployment

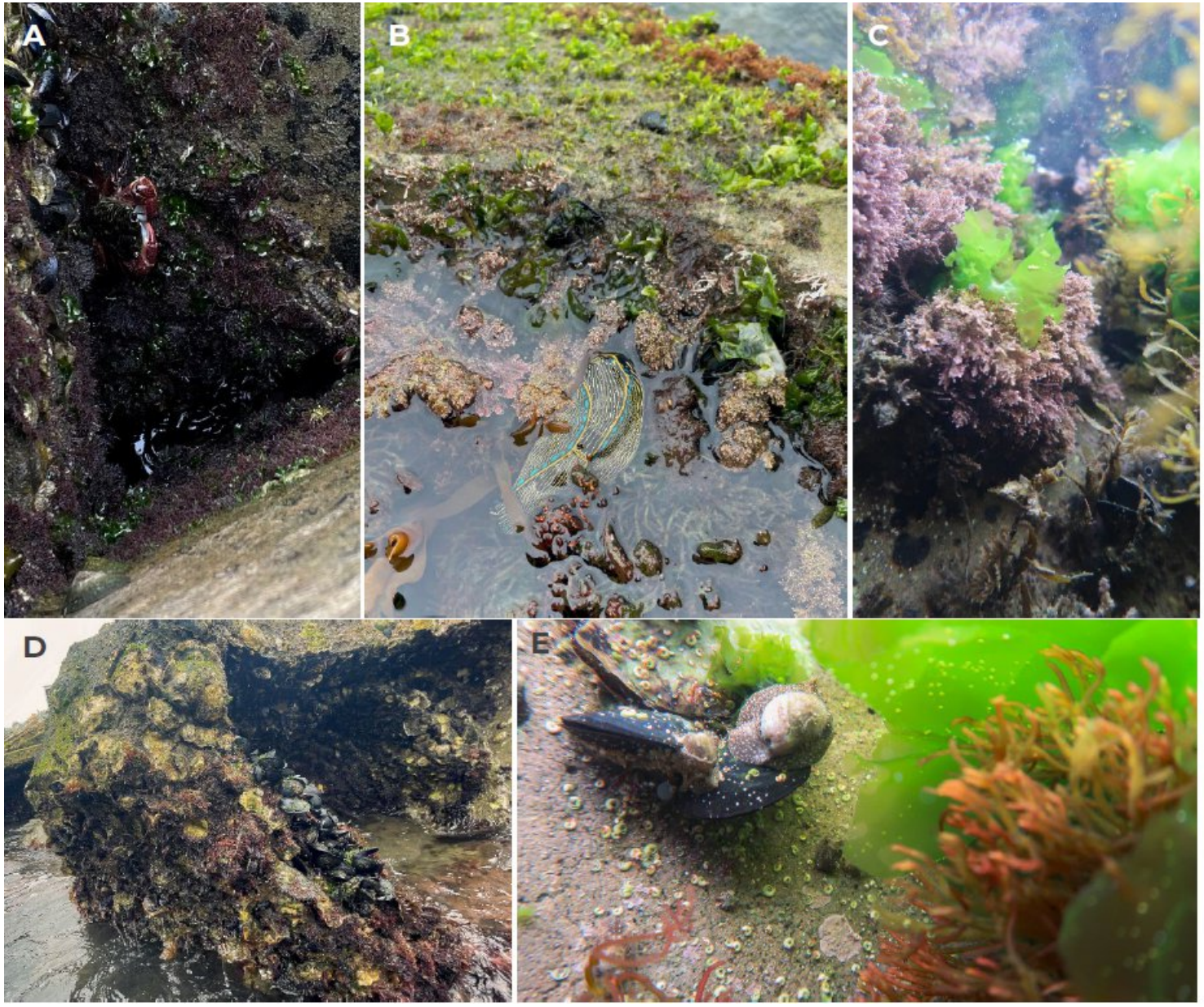


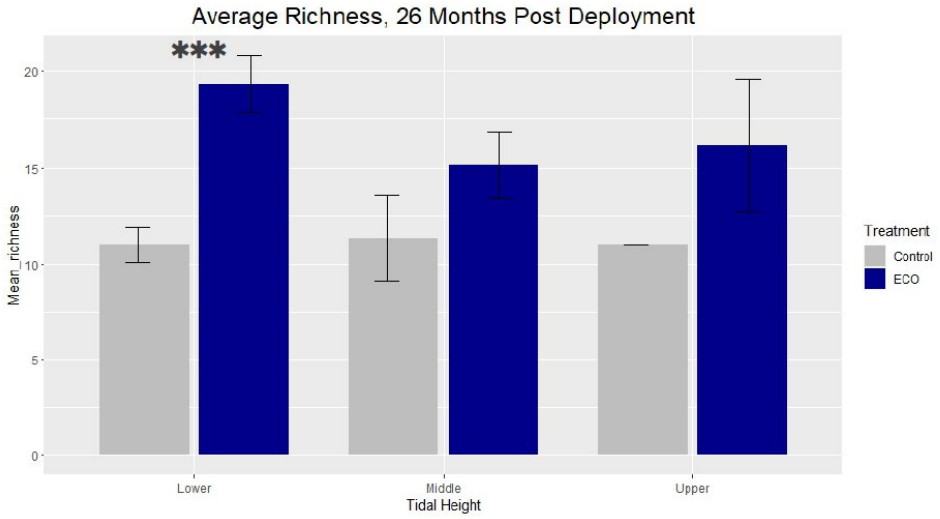


Before



26 Month Post Deployment

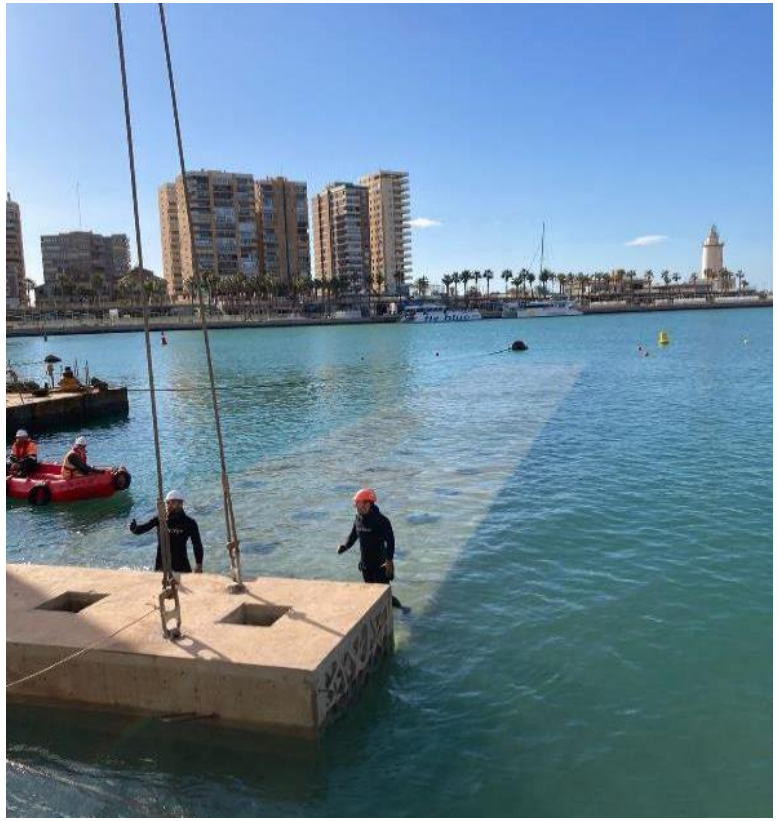




IGY Malaga Marina

Ecological enhancement of vertical pier

2021 - 2022 Málaga Marina, Spain



3rd Party Design / ECOncrete technology integration

IGY Malaga Marina

Ecological enhancement of vertical pier

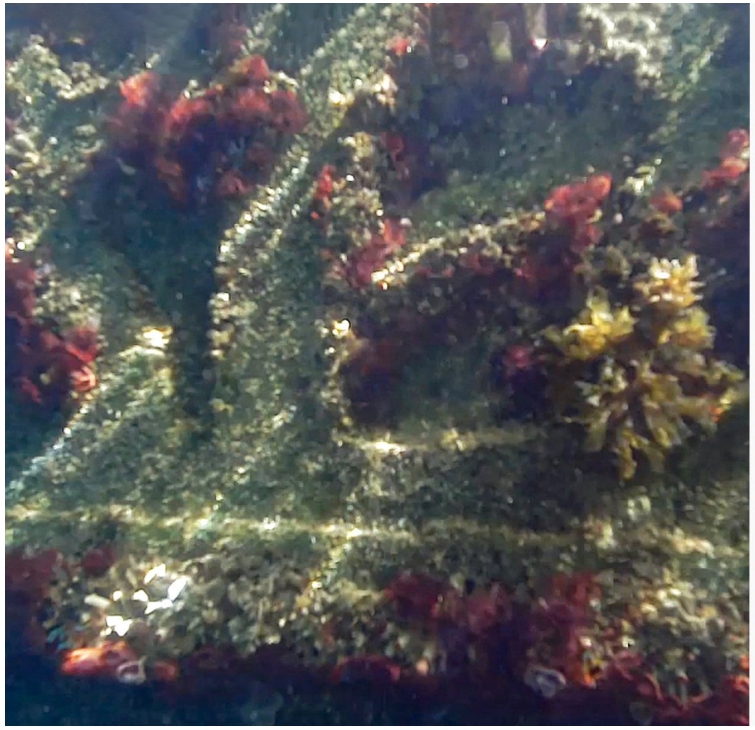
ferrovial

OCEAN CAPITAL PARTNERS

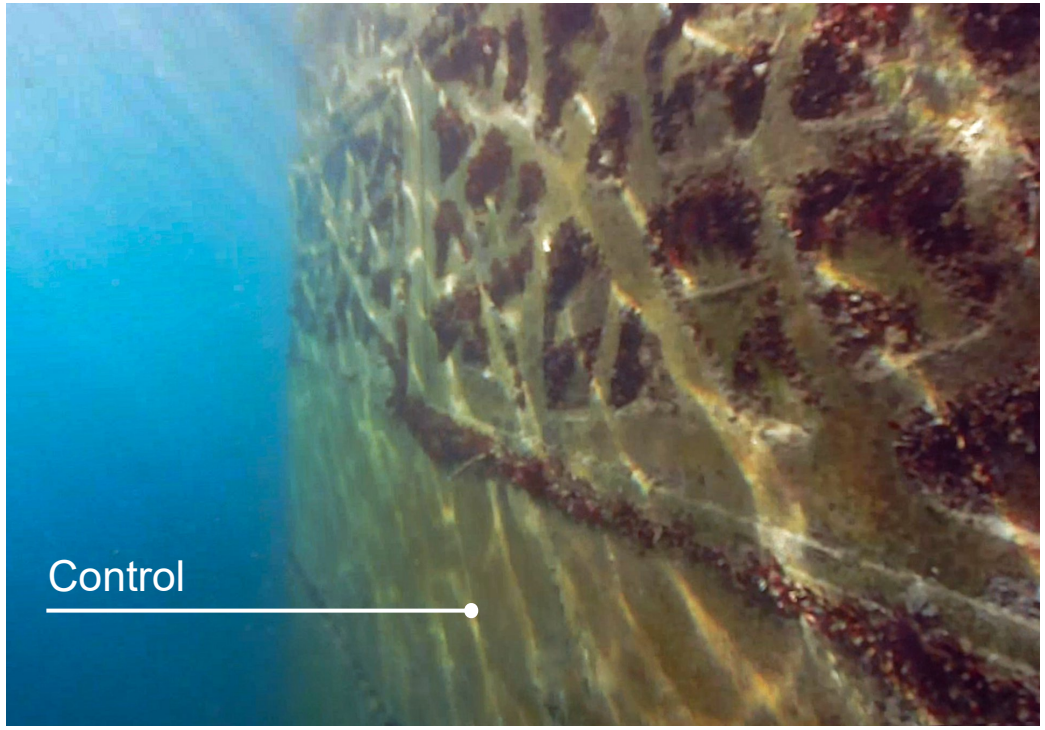
IGY Malaga Marina

Ecological enhancement of vertical pier

2021 - 2022 Málaga Marina, Spain



9 months post deployment

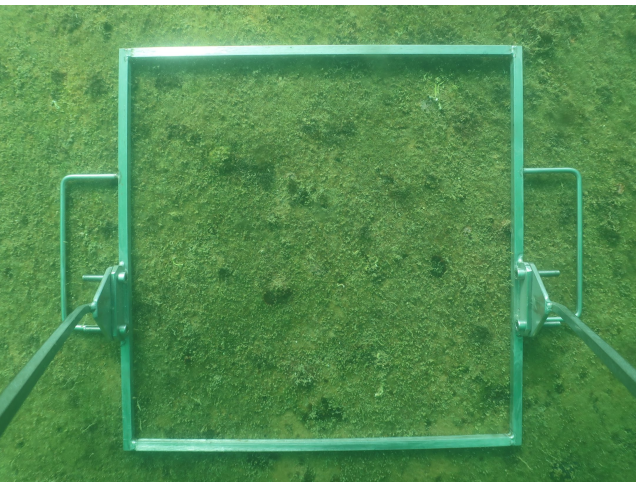


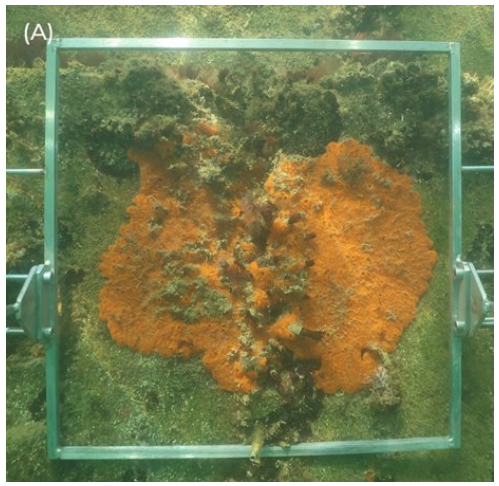
Upper rows: ECONCRETE

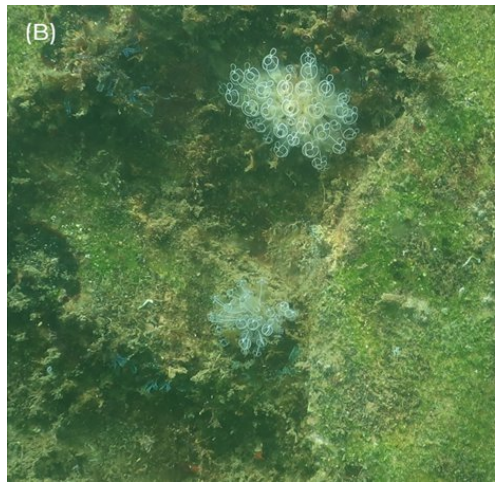
Lower rows: Traditional concrete

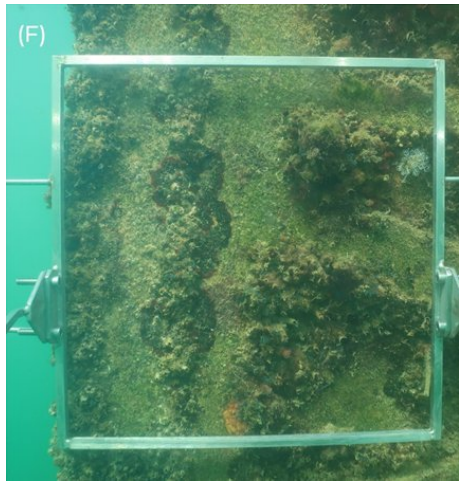
IGY Malaga Marina

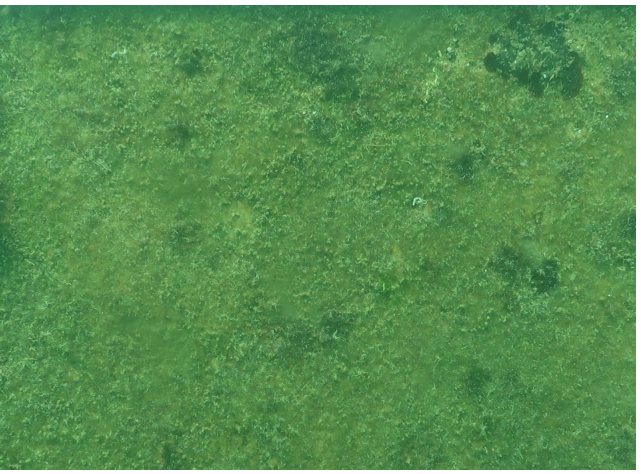
Ecological enhancement of vertical pier

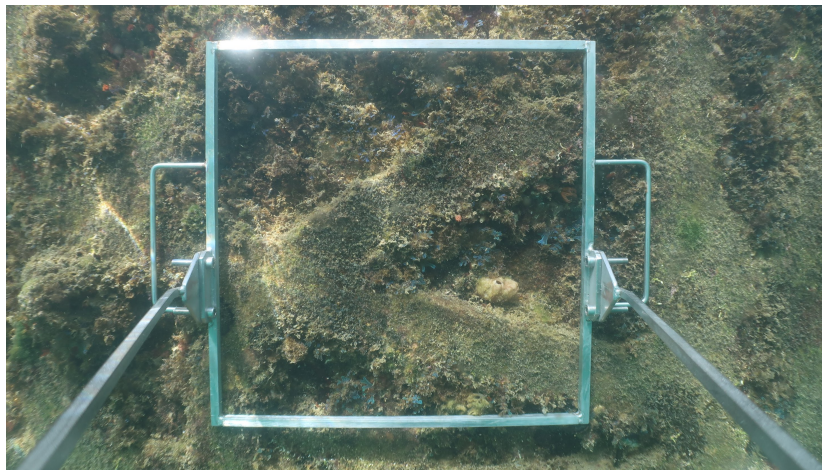










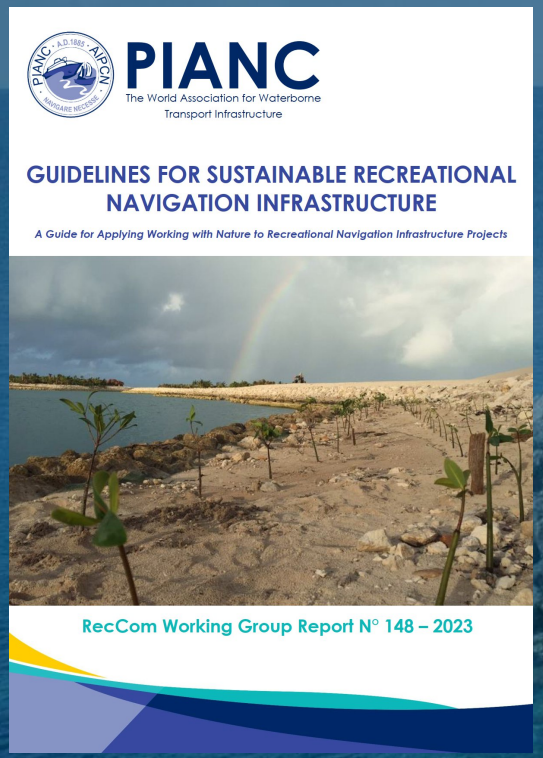


Control

ECOncrete / 13 months post deployment

ECONCRETE

Highlighted in:



8.2.8 IGY Málaga Marina, Spain

The redevelopment of a harbour area into a new superyacht marina incorporated bio-enhancing concrete technology to a vertical breakwater to enhance its ecological profile. The solution is used on a portion of the 2 x 4 x 1 m concrete blocks, applying a bio-enhancing concrete composition and science-based surface-design.

The admix – one key component of the patented bio-enhancing concrete solution – seals the concrete internally to improve impermeability and increase lifespan of the structure. The concrete composition creates an environment beneficial for the colonisation of the surface by marine organisms. The surface complexity of the concrete blocks is based on biological studies and biomimicry design principles. It is adapted to the local environment to support the natural development of local species.

The application of the technology results in a healthy ecosystem developing on the concrete, quickly generating a layer of bio-protection, strengthening and protecting the structure and reducing maintenance. The increased biodiversity also improves water quality and serves as a natural carbon sink, actively sequestering CO_2 during the lifetime of the structure.

The applied technology meets international recognized concrete standards (i.e. EN, BS, ASTM and AS standards), and neither the manufacturing nor the installation requires modification of standard construction processes.

Figure 8.10: Concrete blocks with bio-enhancing admix and texturing for marina application (photo by ECOncrete Tech LTD)

2023

Guidelines for Sustainable Recreational Navigation Infrastructure

Living Ports Project

Ecological enhancement of Port infrastructures

2021 - 2024 Port of Vigo, Galicia, Spain

FUNDING:

European Union's Horizon 2020
Research and innovation program
Under Grant Agreement GA970972

PARTNERS: ECONCRETE, DTU, Puerto de Vigo Autoridad Portuaria de Vigo, Cardama Shipyard

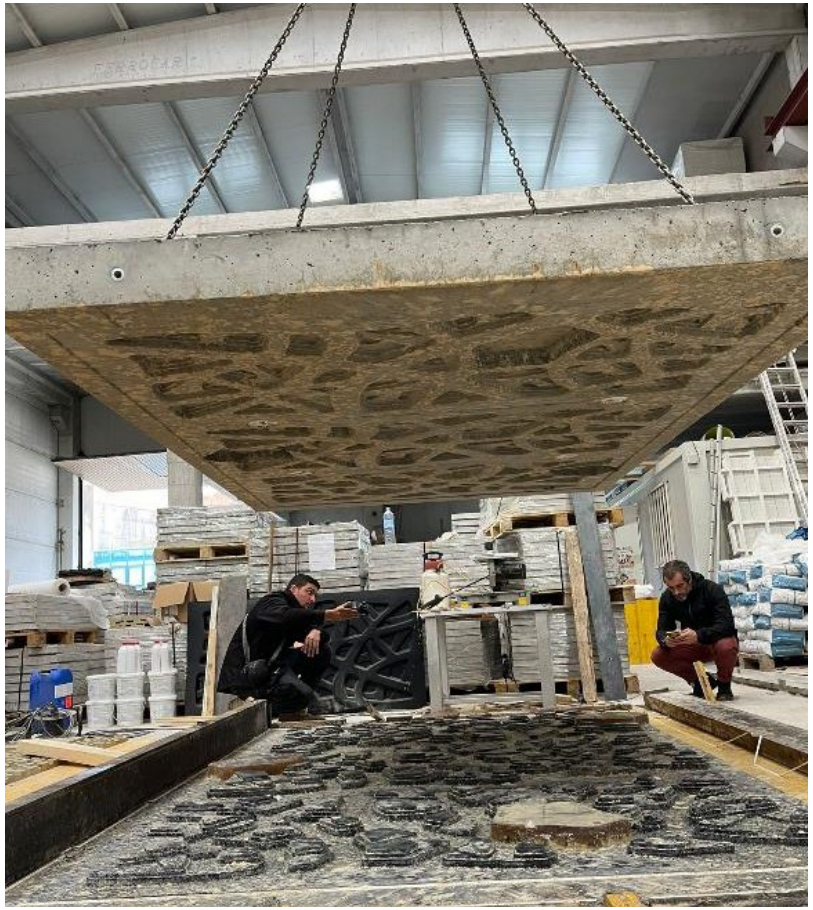
Living Ports Project

Site 1 – Seawall Panels + Underwater Observatory

ECONCRETE

Living Ports Project

Site 1 – Seawall Panels + Underwater Observatory



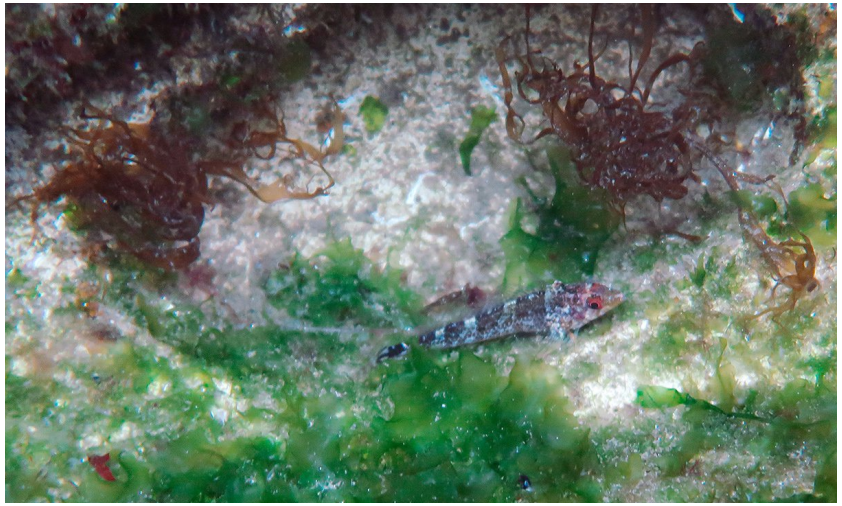
Living Ports Project

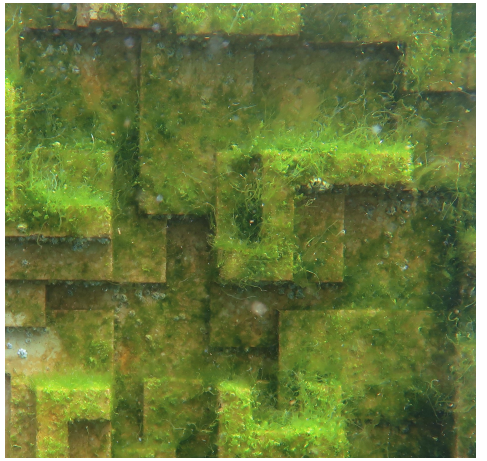
Over 27,000 visitors / 7 months post deployment

ECONCRETE

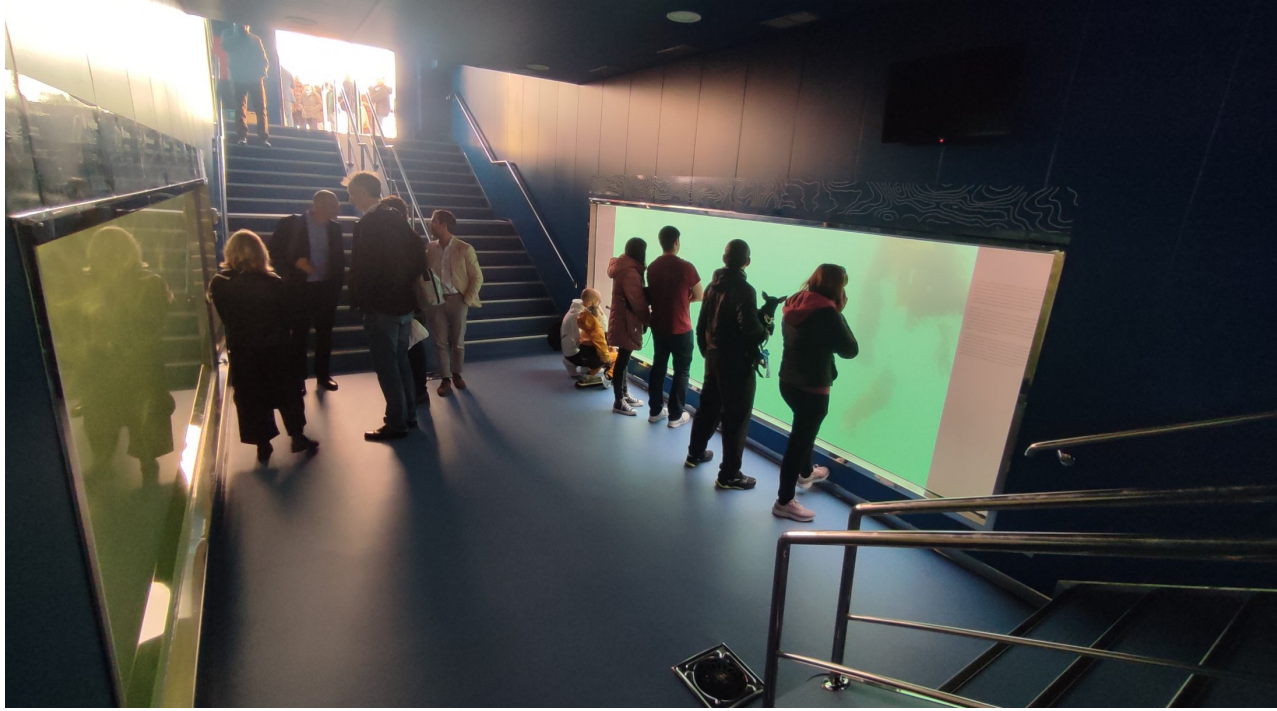
Living Ports Project

Site 1 – Seawall Panels (3 months post-installation)






Balano
Ameixa
Barnacle
Estrela de mar
Sea star

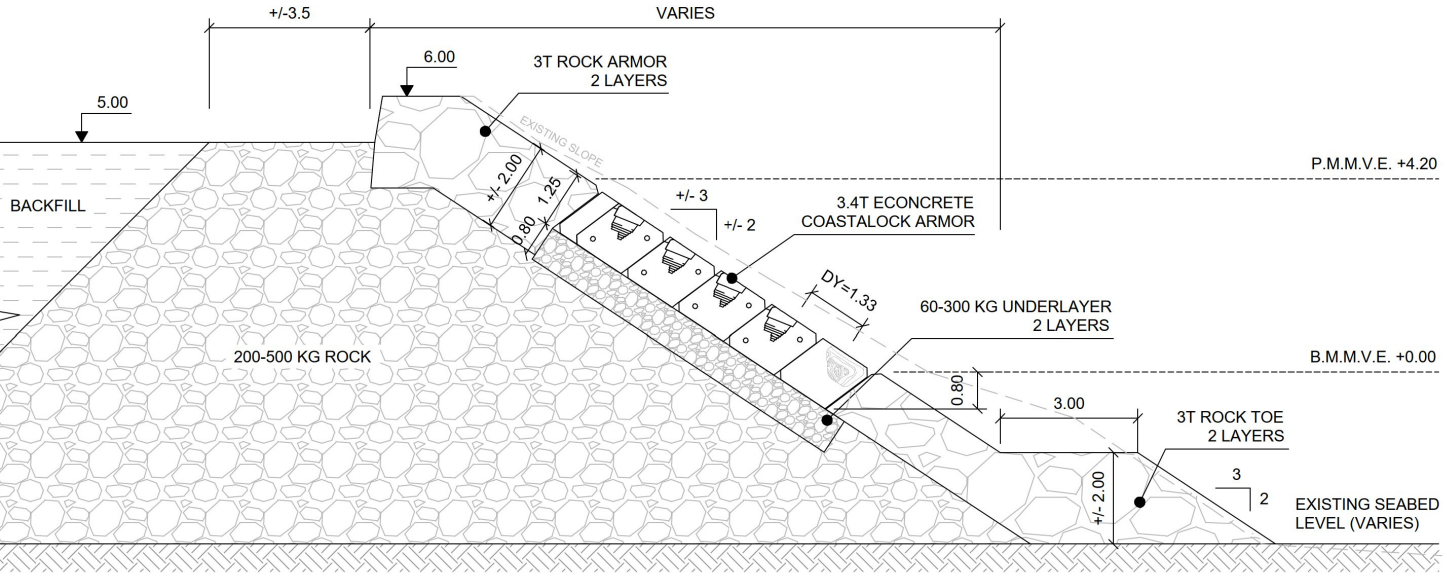



LIVING PORTS PROJECT
Frentes marítimos que incluyen la naturaleza en su diseño
El proyecto Living Ports aboga por una construcción marítima responsable que funcione tanto estructural como ecológicamente. Este muelle está constituido por dos tipos de diseño de ECOncrete, ambos fabricados con hormigón biopotenciador, textura y elementos de retención de agua capaces de crear hábitats marinos para los ecosistemas locales. Asimismo, se han instalado paneles de control fabricados con hormigón convencional para proporcionar datos comparativos durante el seguimiento científico del proyecto.
Deseño de peiraos que inclúen a natureza
O proxecto Living Ports defende unha construción mariña responsable que funcione tanto a nivel estrutural como a nivel ecolóxico. O cantil do peirao comprende dous tipos de texturas ECOncrete feitas con formigón biopotenciador e que inclúen elementos de retención de auga que favorecen a creación de hábitats para o ecosistema local. Ademais, inclúense paneis de control de formigón común cuxa misión é proporcionar datos comparativos para o seguimento científico durante o proxecto.
Nature-inclusive waterfront design
The Living Ports project champions responsible marine construction that functions both structurally and ecologically. The quay wall opposite comprises two types of ECOncrete textures, using bio-enhancing concrete and water-retaining elements to create habitat for the local ecosystem. Control panels made from regular concrete are installed to provide comparative data during the project's scientific monitoring.
ECONCRETE 1
ECONCRETE 2
CONTROL
ECONCRETE

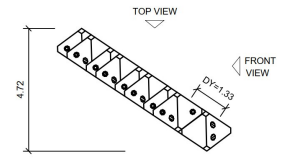

ECONCRETE

Living Ports Project

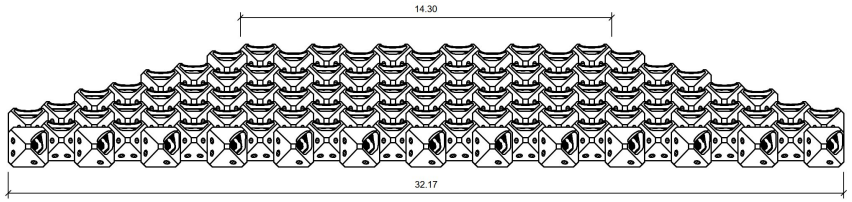
Site 2 – Coastalock Units installation



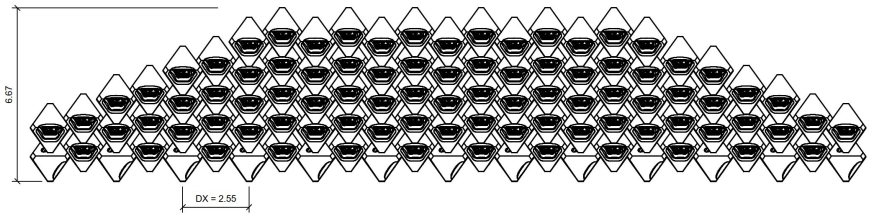
TYPICAL ROCK REVETMENT SECTION WITH ECONCRETE COASTALOCK 1:100



SIDE VIEW



FRONT VIEW



TOP VIEW

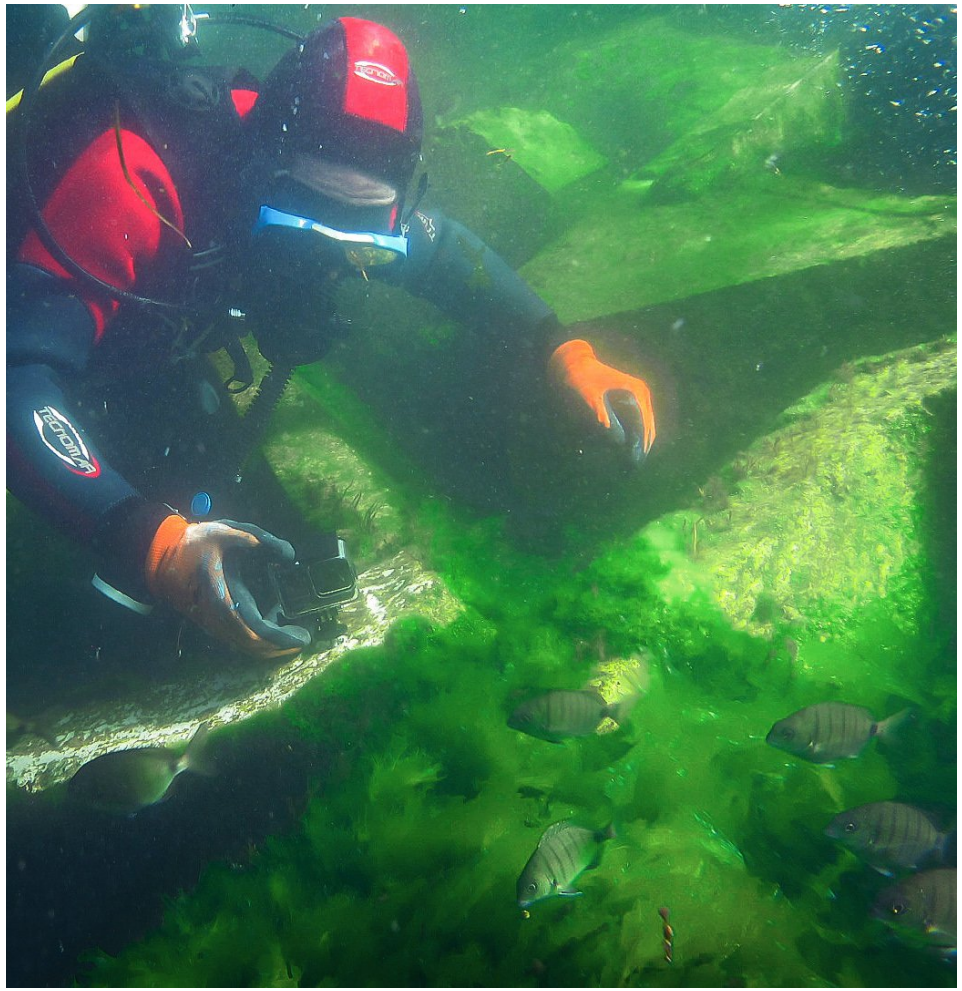
ECONCRETE

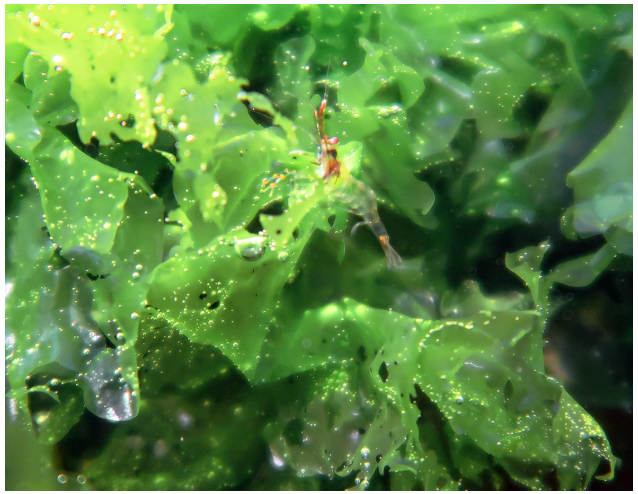
Living Ports Project

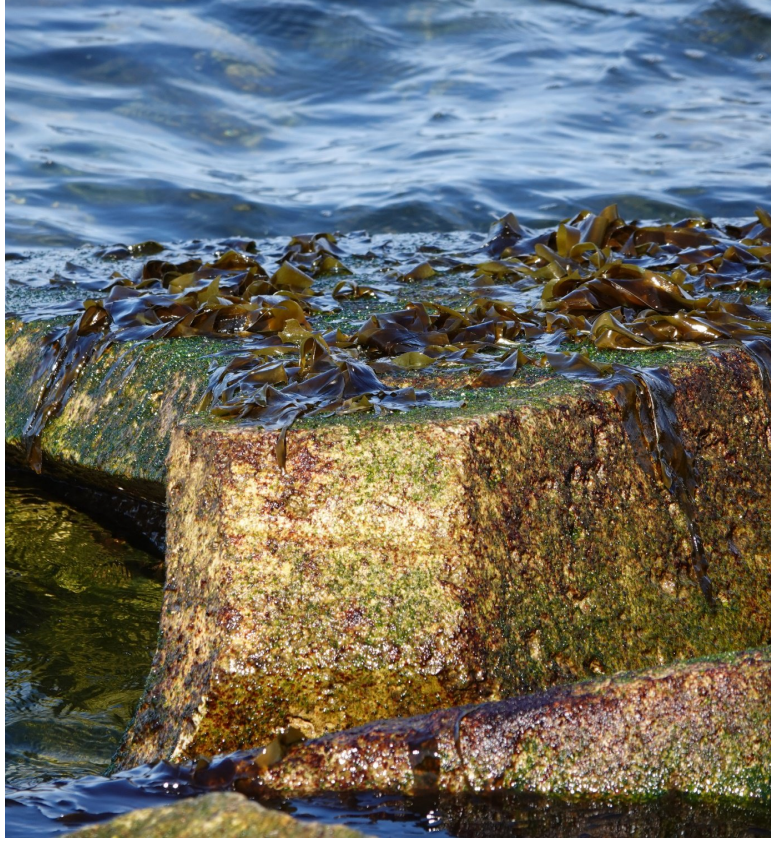
Site 2 – Coastalock Units (3 months post-installation)

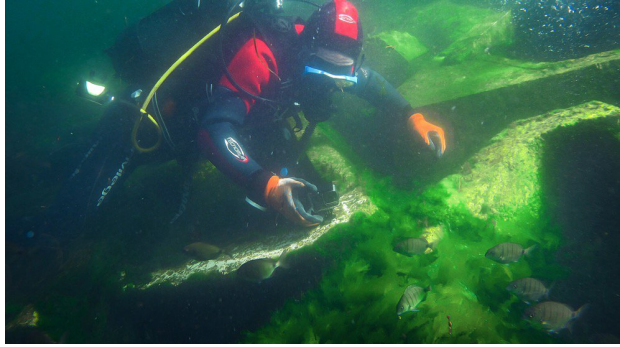
Living Ports Project

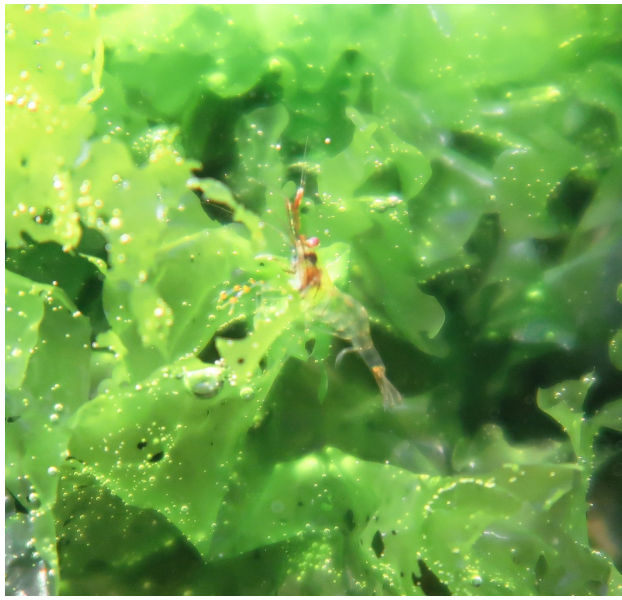
Site 2 – Coastalock Units / Biological monitoring









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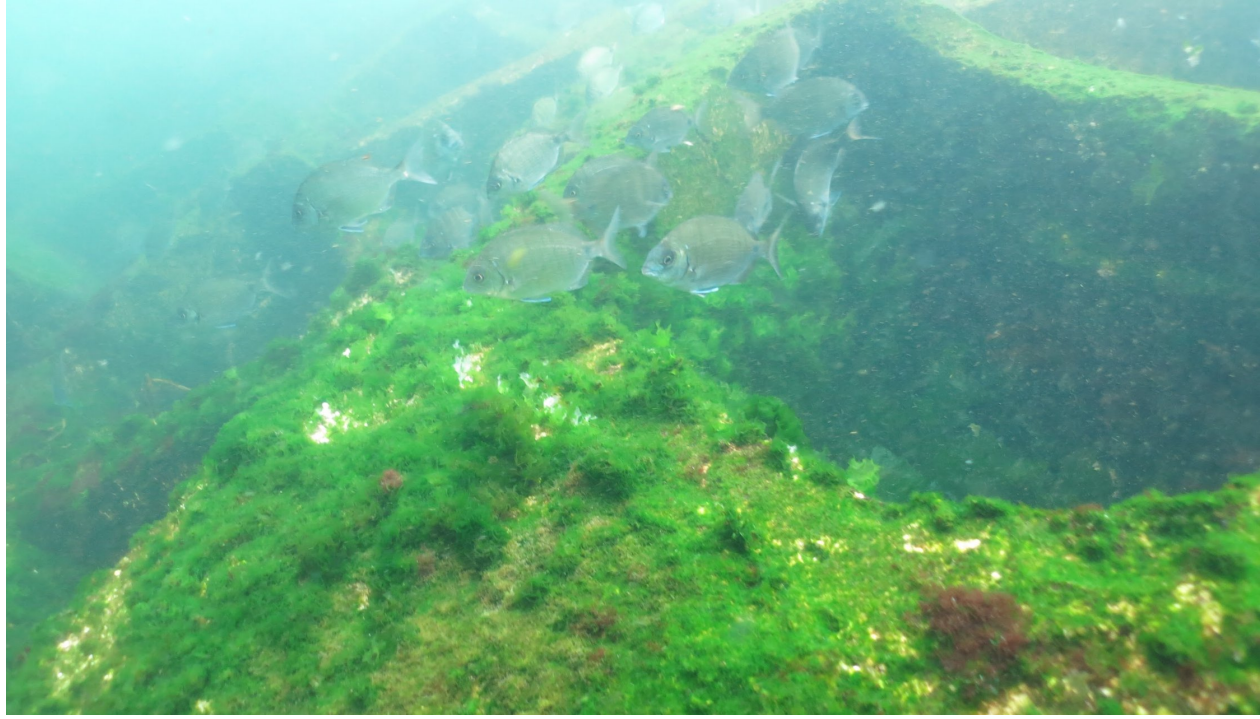
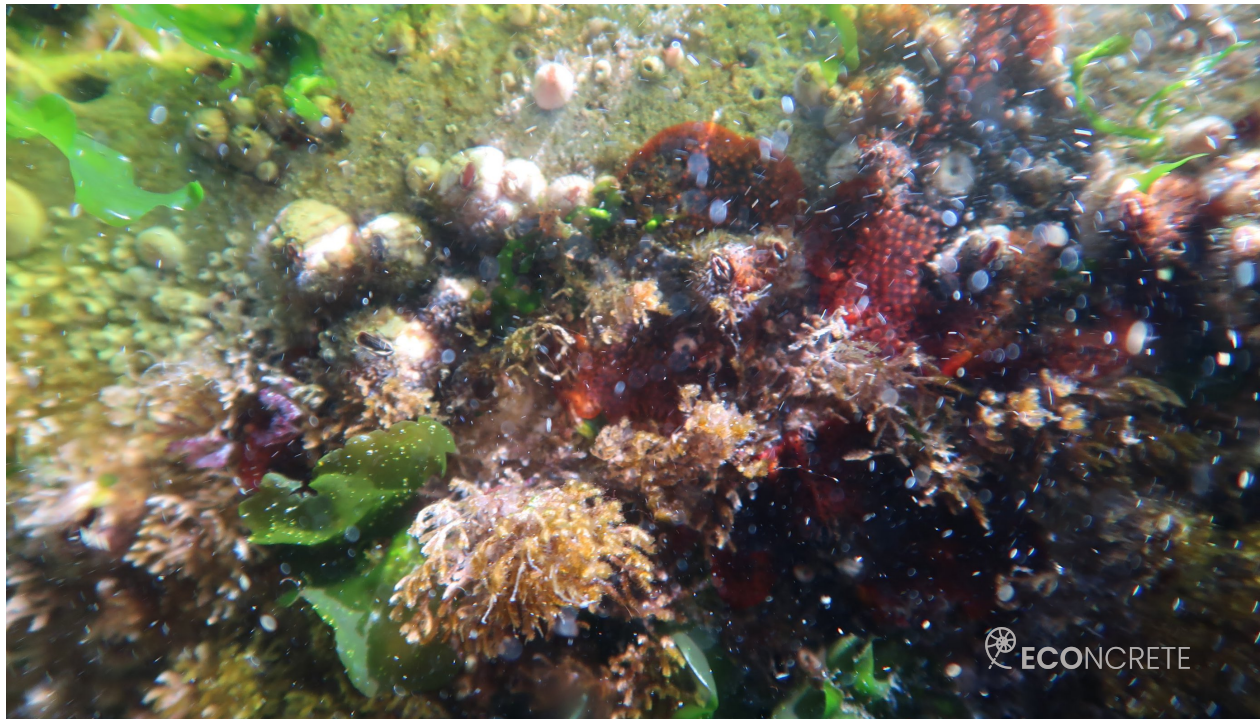


6 months post installation



Benefits

- Meet project environmental mitigation requirements
- Unlock new biodiversity enhancement opportunities
- Accelerate stakeholders’ alignment and permitting
- Community engagement