Interreg

EUROPEAN UNION

2 Seas Mers Zeeën

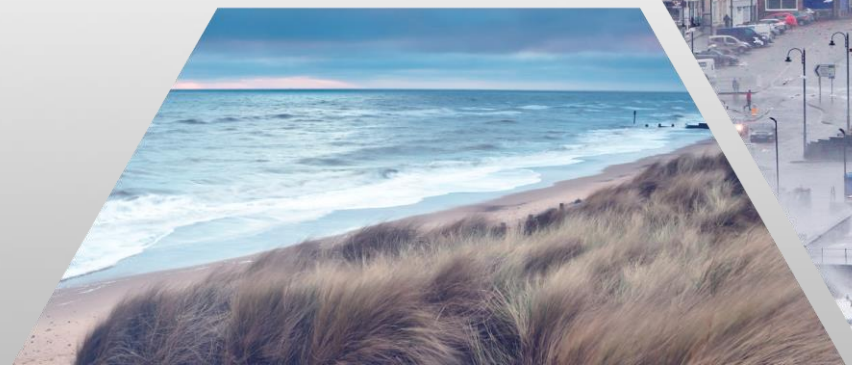
SARCC

European Regional Development Fund

I2SM

Hybrid Nature based solutions presented by SARCC.

29/06/2021



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William Coulet
Exo Environmental

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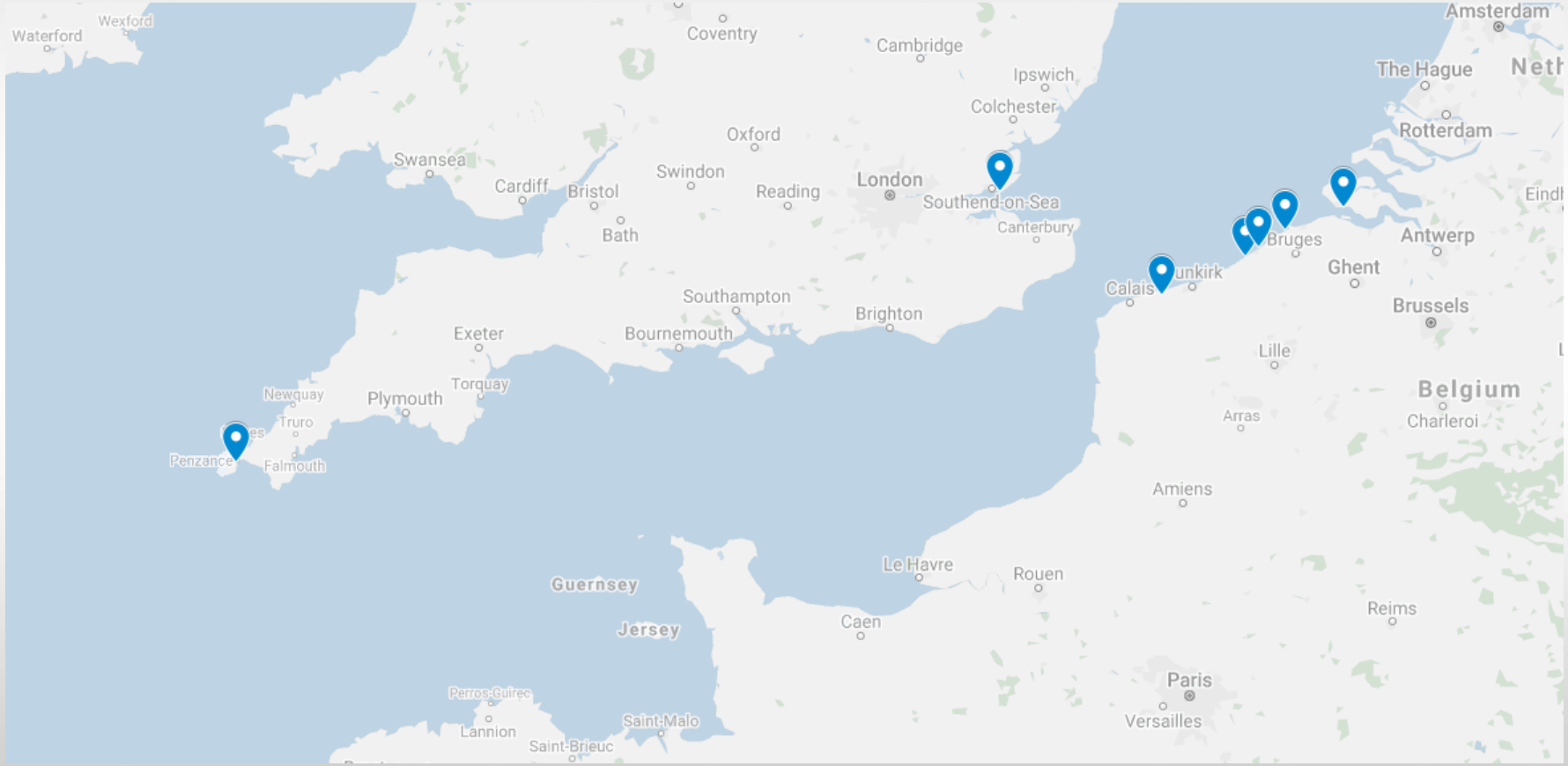
Quick intro to SARCC

- The SARCC project aims to mainstream nature-based solutions (NBS) into coastal management and policy making.
- It does this by building capacity of urban leaders and decision makers to deploy NBS and understand the benefits they offer in comparison to traditional infrastructure. This can be as stand-alone projects or integrated into existing grey infrastructure, known as Hybrid-NBS (HNBS).

14 partners across 2Seas region

7 NBS pilots


Amsterdam
Waterford
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Penzance
Falmouth
Amiens
Le Havre
Rouen
Guernsey
Jersey
Caen
Reims
Paris
Perros-Guirec
Lannion
Saint-Malo
Saint-Brieuc
Versailles

Exo's Role within SARCC

As part of SARCC Exo have developed unique 3D printed surface textures based on our experience of Greening the Grey™ and GeoBlock™ Technology.

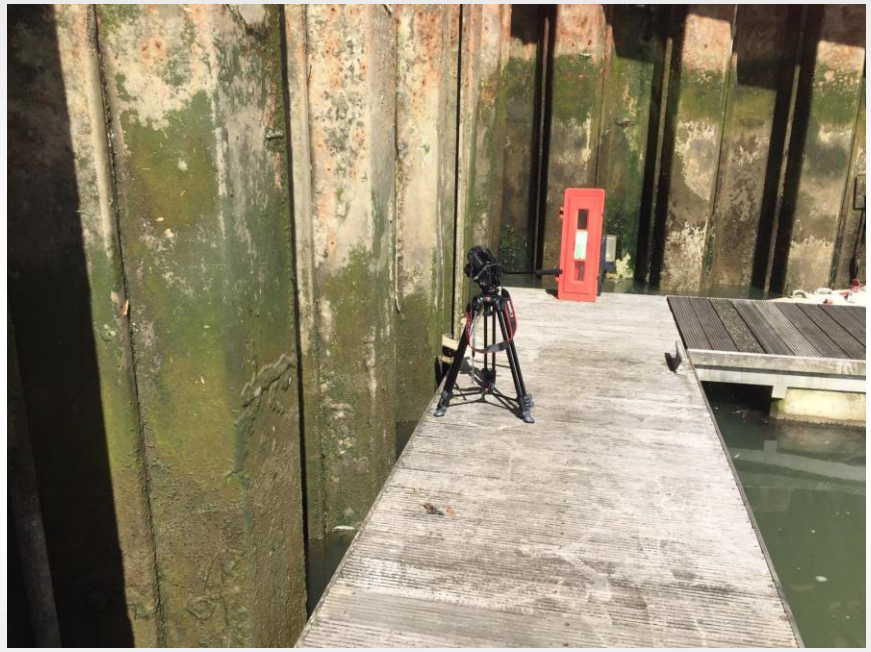
This involves the stabilisation of waste such as dredged sediment or quarry by products, and incorporating this with our 3D printed textures, to form a bio-receptive and low impact aggregate.

HNBS

- Where hard engineering dominates, Hybrid Nature based solutions can be used (HNBS) to boost biodiversity and combat coastal squeeze.

- This technique includes development of complex surface textures using our 3D printing technology and retrofitting these to existing grey coastal defence structures, commonly found in towns and cities.

Hard infrastructure



Steel sheet piling

Concrete

Hard infrastructure

Open asphalt

Quarried Rock

Example of HNBS

Novel eco rock armour and piling habitat, designed with enhanced surface texturing and cups of various sizes to trap suspended mud and provide feeding/sheltering opportunities for intertidal marine organisms.

Ascidiacea

Actiniaria

Haliclona

Enteromorpha

3D printing

- Our 3D designs are inspired by nature.
- At Exo we try to mimic naturally forming variable textures and surfaces to transfer bio-receptive morphology to our 3D printed products.
- We have been inspired by hexagonal structures in Bee honeycombs, small ledges and gullies found in intertidal rock pools, and rounded profiles of low amplitude dunes to name just a few!

Biodiversity enhancers

- The inclusion of complex surfaces act as a biodiversity enhancer, providing greater variation of environmental parameters important for biofilm development, such as oxygen saturation.

- The turbulent flow over these multi void and heterogenous surfaces can cause variable eddy formations, creating a higher diversity of feeding environments, leading to greater overall biodiversity and micro niche habitats.

Bio-armouring

- Not only do these textural additions lead to greater diversity in the intertidal zone, but also over time act as a bio armouring agent.

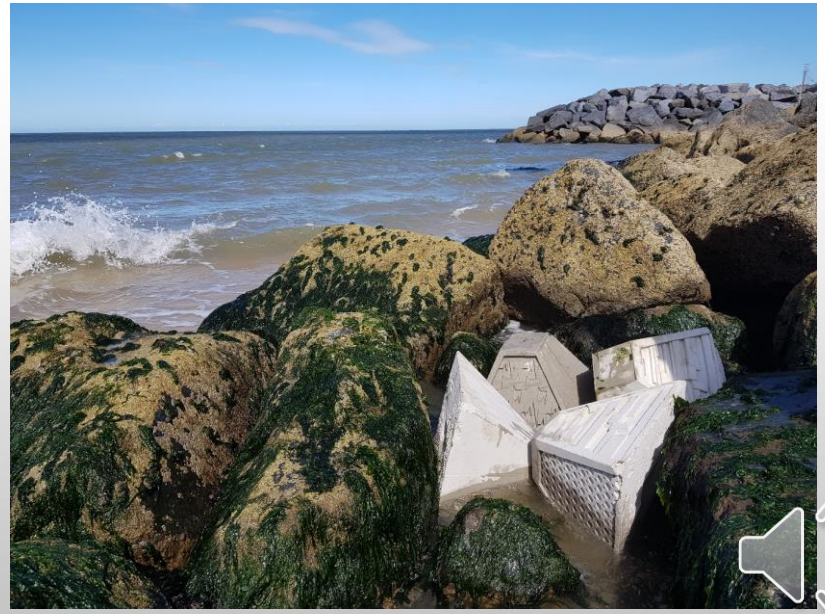
- The growth of initial biofilm followed by calcareous organisms increases the strength of the units, reducing maintenance needs and costs of replacement.
- And adding a further layer to aid erosion control.

Pilot studies

- Through SARCC we have deployed prototypes in pilot locations across the UK. Including novel piling habitats deployed in Brightlingsea Marina and Southend on Sea and textured rock armour units deployed along the River Colne, Essex and in Newlyn, Cornwall.

Pilot studies

Siliceous algae and *Enteromorpha* inhabiting our products.



Net Environmental Gain

Periwinkles (*Littorina saxatalis)* inhabiting artificial ledges on our Eco Rock armour units in Newlyn, Cornwall, UK.

Polychaeta inhabiting the benthic mud filled cups on our pilling habitat units in Brightlingsea Marina, Essex,

Ascidian (Botryllus leachii) inhabiting subtidal habitats in Brightlingsea Marina, Essex, UK.

Other research

- As part of our own research Exo have developed numerous trials and experiments to determine the effectiveness of surface treatments at encouraging bio colonisation.

- These results will inform us on different methods to improve geochemical suitability and further enhance bio receptiveness.

Other research

Concluding remarks

- Through unique research, we are contributing towards innovations in the Eco-Technology arena and supporting a circular economy of sustainability by reducing disposal costs and the associated carbon emissions.
- As well as creating products which serve as bio-diversity enhancers and perform vital services, such as erosion control and habitat functions.

Concluding remarks

- With our research we aim for 'Greening the Grey™', supporting threatened coastlines with habitat opportunities and biodiversity enhancements.
- If you are interested in any of our results or products to improve your site's or project's green credentials or corporate responsibility, please get in touch!

Questions

www.sarcc.eu