

**MARINEFF PROJECT – ARTIFICIAL ROCKPOOLS
SANDBANKS, POOLE HARBOUR AND BOULDNOR, ISLE OF WIGHT, UK**
Bournemouth University, Artecology

BIG Biodiversity Challenge Award Category: *Habitat Creation – (< 5Ha small scale)*

Project overview

Marineff is a cross-Channel collaboration bringing industry-based and academic partners together to explore habitat creation on manmade coastal structures. Ninety artificial rockpools have been installed along ~200m of concrete seawall at two sites on the English South Coast, resulting in exciting uplift in marine biodiversity and a new species record.

What were the biodiversity conditions on site, prior to the enhancement?

At both sites, the existing seawall was a sheer vertical surface comprised of smooth concrete with no cracks or crevices, water retentive features or shaded areas. Extensive surveys were undertaken to characterise the existing species inhabiting the site, which predominantly included generalist species of seaweed, barnacles and sea snails. At the Isle of Wight and Poole Harbour sites, a total of 18 and 27 species were recorded living on the seawalls respectively. The seawalls had low amenity value to the public as a consequence.

What were the reasons behind this project ?

The drivers behind this project were to demonstrate the efficacy of larger scale eco-engineering installations and to allay and address coastal engineers' questions and concerns. The rockpools were installed in single rockpool, 3 rockpool and 5 rockpool groupings at mean tidal level to determine the optimal arrangement for biodiversity net gain to better advise coastal practitioners. Public engagement with the project was also key. The rockpools are hand-cast and provide aesthetic appeal as well recreational benefits for the local community, 'greening the grey' and providing opportunities to explore through rockpooling, increasing access to nature for all.



The seawall at Sandbanks prior to installation.



The seawall at Sandbanks following rockpool installation 6 months on.

What were the biodiversity measures taken?

Following careful consultation with eco-engineering company Artecology, who have pioneered small-scale trials of artificial rockpools all over the UK, we:

- Produced 90 rockpools using low carbon concrete and re-used materials during the manufacture process (bubble wrap) to minimise waste.
- Designed each rockpool to provide refuge space for snails and limpets on the exterior with small (~1.5cm) pockets and with a rough texture on the rockpool interior to enhance attachment for seaweeds and barnacles. The rockpools provide a ~10cm deep pool of seawater that would otherwise not occur on the seawall, providing refuge for crabs, fish and prawns. Not only do the rockpools themselves provide additional habitat, they also have the potential to alter the microclimate on the surrounding seawall by casting shade and dissipating wave energy.
- Used an optimised retrofit design based on the successful fixtures of previous artificial rockpool trials that are designed to be easily installed, maintained and, if necessary, decommissioned. The arrangement of the rockpools in this experimental deployment are designed for replication on larger engineering projects.
- Engaged with local stakeholders, study groups, forums, Natural England and council prior to installation, and have engaged with local community groups and college students since, providing work experience for two university students.
- Planned interpretation for installation during summer 2021 to increase public engagement and provide legacy benefits for community.



Top: a rockpool being made with the bubblewrap lining the mould. Bottom: the rockpools being installed at Sandbanks, Poole Harbour by Artecology.



Researchers from Bournemouth University monitoring the artificial rockpools at Sandbanks, Poole Harbour.

Further information

The rockpools were installed with the permission of the asset owners. Holes were drilled and filled with mortar resin, which threaded bars were pushed into while the mortar was soft. The rockpool brackets were aligned with the bars and secured with washers and Nyloc nuts. This method permits easy replacement or removal of the rockpools and prevents ingress of seawater into the structure, protecting it from damage.

Baseline monitoring was conducted at both sites and included 150 quadrats along the coastal structure to characterise the existing biological colonisation. Since rockpool installation, both sites have been monitored at 1-month, 3-month, 6-month and 9-month intervals with 12-, 18- and 24-month intervals remaining. The data gathered will look at the benefits of the rockpools at four spatial scales: the tidal height, the wall section (~2m wide), the entire stretch of wall (~80m) and between both sites.

Success! Since installation in July 2020, an additional 18 species and 11 species have been identified on the seawall at the Sandbanks and Bouldnor site respectively, due entirely to the rockpool installations. Better still, this includes a Montagu's blenny, a rockpool specialist and a completely new species record for Poole Harbour. For replication in industry, we recommend that the rockpools are installed no higher than mean high water neap tidal level.

Public engagement has already been positive with young families starting to 'rockpool' in them. Further engagement events are planned when restrictions have eased. The artificial rockpools were also featured on BBC Radio Dorset's Breakfast Show.

Project Team

- Funding provided by EU Interreg Channel Manche, co-funded by the European Regional Development Fund, for the Marineff project.
- Co-designed, manufactured and installed by Artecology Ltd.
- Management and monitoring by Bournemouth University staff and student volunteers.



Top: Discovering a prawn in one rockpool. Bottom: A Montagu's blenny in a rockpool - new record for Poole Harbour.



A young family crouch down to see what they can discover in the rockpools



What was the motivation for carrying out the enhancement?

The motivation was to gain a relatively long-term dataset for an intertidal enhancement at multiple sites, to compare the magnitude of impact within different coastal contexts and identify the presence of a 'halo effect', where the rockpools alter surrounding microclimate and support biodiversity around the pools. It was also important to evidence that retrofit poses little to no detriment to the integrity of the structure in a scaled-up experiment. Although enhancements of this type are commercially available, their acceptance into the mainstream industry has been hindered without knowing the optimal arrangement or number of rockpools, which motivated the experimental design.