

ARTIFICIAL ROCKPOOL, ABERYSTWYTH UNIVERSITY & COLLABORATORS



BIODIVERSITY ENHANCEMENT OVERVIEW

Around 40% of the coast around England and Wales is protected by some form of artificial coastal defence infrastructure. Anticipated climate change and increasing coastal development means that more hard defences are likely to be necessary in the future to protect against erosion and flooding.

Engineered coastal defence structures can have a considerable impact on the natural environment. They also tend to be poor quality habitats, supporting low biodiversity and non-natural communities of plants and animals. This is thought to be largely down to the high wave disturbance and low habitat complexity characteristic of coastal defence developments.

We know that rockpools are an important refuge habitat for marine biodiversity on natural rocky shores, and they are generally absent from manmade habitats. So we created artificial rockpools in a new coastal defence breakwater at Tywyn, Gwynedd, to make it more like a natural habitat and to enhance the associated biodiversity.

We commissioned local rock-drilling company, SMS Wales, to drill-core 40 holes ('artificial rockpools') of 15cm diameter into the granite breakwater units. We drilled some deep (12cm) and some shallow (5cm) pools and staggered them at different times of year, in order to establish the optimal design and timing for habitat enhancements of this sort.

Fact box

Company name:

Gwynedd County Council, Marine Ecological Solutions Ltd., Aberystwyth University, Bangor University, Knowledge Economy Skills Scholarships (KESS), SMS Wales

Project name:

Artificial rockpools

Location:

Tywyn, Gwynedd, Wales

Biodiversity enhancement:

Artificial rockpools added to an intertidal breakwater

Size:

40 pools

Cost:

Rock drilling services ~ £1000 per 20 pools

Tips:

- Drill holes at mid-shore level to enable extension of vertical distribution of lower shore species and to avoid inundation by sand on mobile shores.
- Maximise surface complexity (e.g. crevices and grooves) to enhance larval settlement and survival.
- Shallow pools are quicker (and therefore cheaper) to drill and currently appear to be just as effective as deep pools.

Year completed:

2014

Categories:

- Large scale permanent
- Small scale permanent
- Most innovative

BIODIVERSITY ENHANCEMENT OVERVIEW *(cont.)*

We have been regularly monitoring the colonisation of the artificial pools, comparing the plant and animal communities to those inhabiting the surrounding breakwater units, and also comparing them to natural rockpools on nearby rocky shores. Our results show that the pools do indeed support a greater diversity of marine life than the plain rock surfaces of the breakwater, and they are just as diverse as natural rockpools.

Although there are a couple of key rockpool species that haven't yet colonised the artificial pools, they have certainly proven to be an affordable and effective means of enhancing biodiversity on the breakwater, and they are easily replicable in a variety of new and existing manmade habitats.

The rockpools were designed to be discrete in order to avoid encouraging members of the public to climb on the breakwater. This was an important consideration in order to safeguard public safety. However, during construction and survey work there has been opportunistic engagement with interested members of the public. Without exception, local residents and visitors have responded positively to the project's aims and findings.

Beyond enhancing biodiversity on the breakwater, the legacy of these artificial habitats includes published contributions to the applied marine conservation literature and a permanent system of replicate mesocosms which may be utilised for future climate change research.

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Photographs of the enhancement

