

Changes in the habitat, fish and invertebrate communities following the installation of the Port Coogee Artificial Reef

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Ecologically sustainable coastal infrastructure such as living harbours and fish friendly marinas are receiving global focus from stakeholders. Purpose built artificial reefs can be deployed into marina's and harbours to create habitat and stimulate increases in the number and types of fish in the local area. This study assessed changes to habitats (seaweeds, seagrass and sand cover), macroinvertebrates (e.g. sea snails, sponges, corals, sea squirts) and fish communities at an artificial reef in Port Coogee, Western Australia.

The Port Coogee Maritime Trail was built in 2016 by Cockburn City Council and Subcon International, establishing the Oceania region's largest marina habitat project. Funding was received from Lotteries West and Subcon International to support the project.

Thirty-four purpose-built reef substrates were installed in a 250 m corridor along the marina breakwater. The 50 tonnes of artificial reef substrate now provides over 100 m³ of complex habitat ranging in height from 1-5 m and in depths of 2 – 9 m.

Four survey sites were established at: (1) Breakwater, (2) Artificial Reef, (3) Omeo Wreck and in the (4) Bay.



Surveys of marine life have been completed before, and then three, eleven and twenty months after installation of the reef to determine how these communities changed.



Fourteen habitat types, 64 macroinvertebrate species groupings and 53 fish species were observed across the four survey periods. Prior to installation, the artificial reef site was covered predominantly by sand with limited seagrass cover.

Coverage of turfing and foliose algae increased on the artificial reef after installation. However, brown foliose algae subsequently declined in coverage 11 and 20 months after installation, a change mirrored at an adjacent breakwater site.



colonial
sea squirts



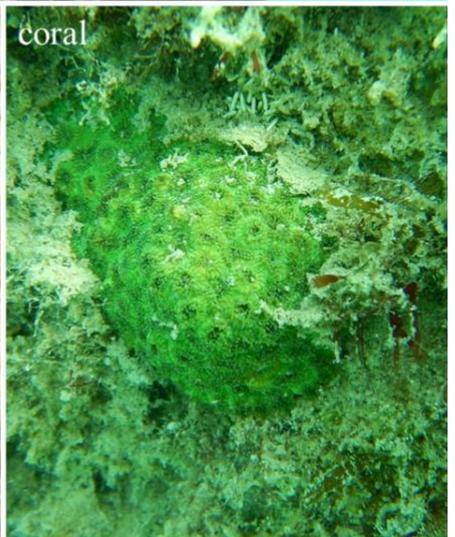
solitary
sea squirts



featherstar

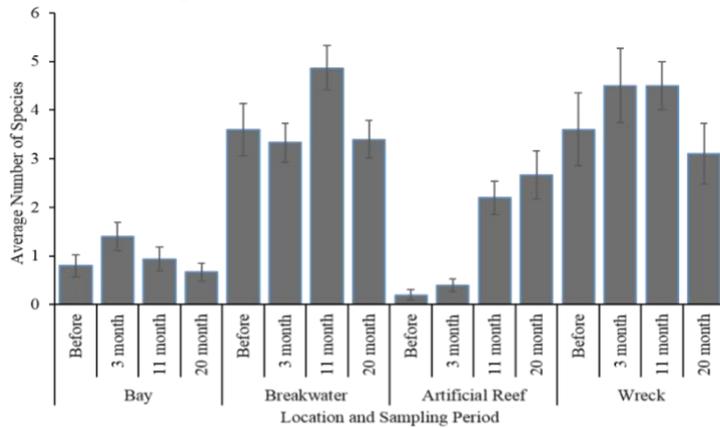


nudibranch

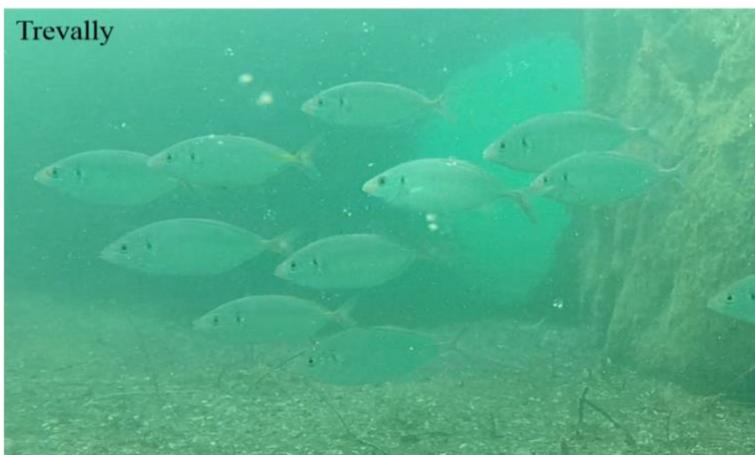
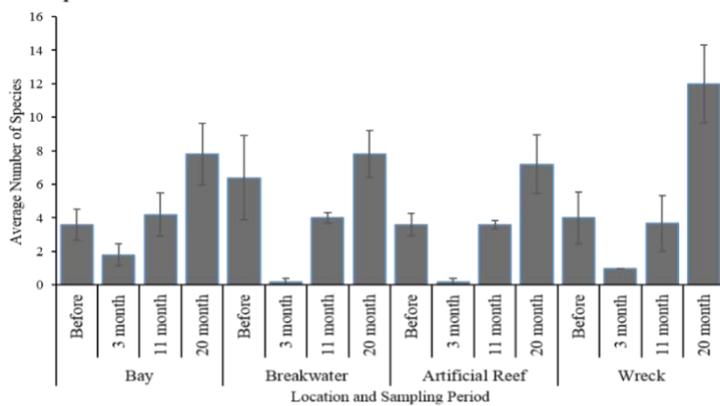


coral

Macroinvertebrate: Species Richness



Fish: Species Richness



The diversity and abundance of macroinvertebrates increased on the artificial reef after installation but remained reasonably constant at nearby locations. This change at the artificial reef was driven by an influx of colourful sea squirts, sponge and sea snail species, popular with divers and snorkelers.

For fish, an increase in diversity and abundance occurred at all sites over the duration of the survey. A greater number of recreationally targeted fish were observed after implementation of a new fishing closure around the reef, the adjacent breakwater and the historic Omeo shipwreck. A number of species popular with recreational fishers and snorkelers were recorded on the artificial reef following its installation, including; crested and dusky morwongs, Western king wrasse, mullet, whiting, Western striped grunter, trevally, tarwine, pink snapper, juvenile baldchin grouper, seapike and snook. Many of these species were not recorded, or were recorded in low numbers, at the artificial reef location prior to its installation.

The habitat, macroinvertebrate and fish species recorded at the Port Coogee artificial reef changed from being similar to the adjacent sandy bay to being more similar to established reef-like structures such as the breakwater and the historic Omeo wreck.

Continued assessment of in the marine community is planned at this location and will provide further insights into the ecological value of habitat enhancement to coastal infrastructure, to recreational activities including diving and snorkelling in the Perth

Metropolitan area and into positive effects of fishing protection.