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# The ecosystem engineers

Restoring native angasi oyster reefs to Kangaroo Island

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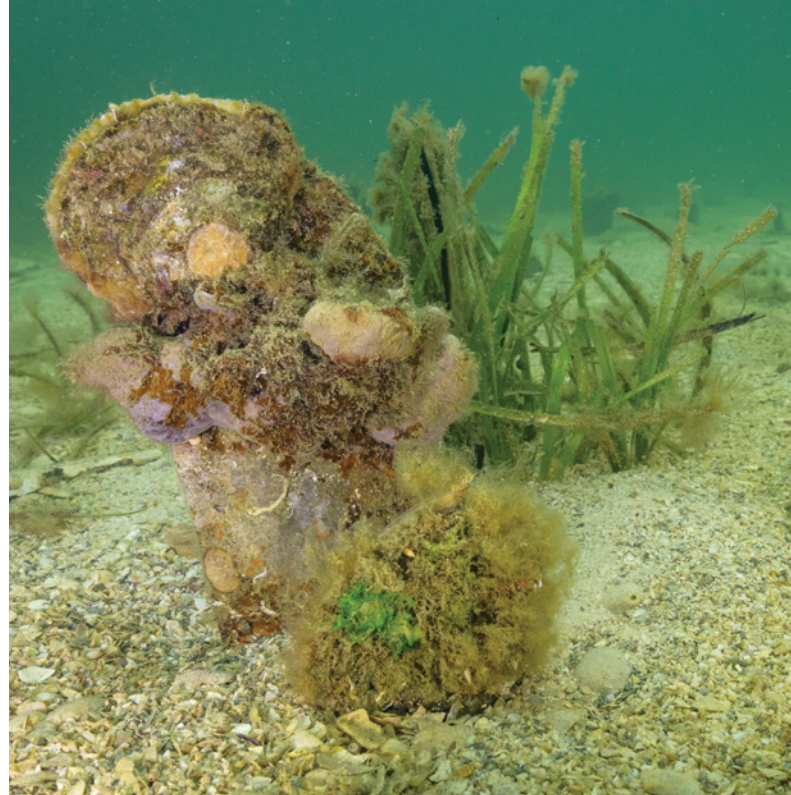
On Kangaroo Island in South Australia, the local community is lending its support, industry and knowledge to the restoration of a vital ecosystem, with the help of a Tasmanian ceramicist.

By Keely Jobe.

Alexandra Comino installing ceramic razorfish shells on a native oyster reef restoration site, 2023. Most of the shells made for this project were porcelain or white stoneware, with a few in terracotta (yellow/orange) or buff stoneware. Image Stefan Andrews

A project to restore Kangaroo Island's native angasi oyster reefs is under way quite literally below the surface





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A razorfish covered in a diversity of marine life, including an angasi oyster towards the top of the shell. Image Stefan Andrews

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Ceramic razorfish shell forms 12 weeks after installation, with attached angasi spat (larvae) and tube worms. Clay is an ideal medium for artificial habitats such as these, as it is of the earth, stable in the marine environment, biosecure once fired, and can be crafted to a form that embraces biomimicry. Image Brodie Philp

Razorfish cut a magnificent profile on the seabed, standing upright like the sails of a yacht filled with wind

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TO MAKE LASTING, POSITIVE MATERIAL CHANGES to a threatened species or ecosystem might sound like a lofty aim, but dreaming big seems to be a standard approach in conservation circles. Yet while the aims of conservation are sometimes grand, the labour often goes unseen and the contributors themselves can fly under the radar. This is the case on Karta Pintingga, or Kangaroo Island, in South Australia, where a project to restore the island's native angasi oyster reefs is under way quite literally below the surface. Here, in the island's northern coastal waters, where the bays are sheltered from brutal southerlies and mammoth seas, the locals are not only trying to regenerate the occurrence of a native species, they're hoping to revive an ecosystem in the process.

Kangaroo Island once had a thriving native oyster population. Although its history of human habitation is mixed and inconsistent, there is evidence of First Nations communities having some connection with the island 16,000 years ago, when it was still joined to the mainland. What's more certain is that with the arrival of European settlers, the local native oysters were quickly harvested to the brink of extinction and it took around 100 years for angasi oysters (*Ostrea angasi*) to be almost obliterated from the island's coastal waters. Usually, when a species is under threat, the challenges it faces are numerous and increasing, originating from different sources and directions, but the angasi's disappearance was due mostly to overfishing. What remained on the sea floor was then dredged up so the shells could be crushed for lime mortar to provide roads and buildings for the community. This colonial building practice is not unique to Kangaroo Island – a history of shellfish harvesting resides in the infrastructure of many Australian towns and cities.

I should note at this point that I love oysters.

If my wallet allowed it, my appetite for oysters might even be referred to as unsustainable. But until I spoke to Alexandra Comino, marine biologist and manager of the Kangaroo Island Landscape Board's Native Oyster Reef Restoration Project, I didn't know much about these shellfish. Alex tells me that oysters like to grow on oysters – they do best when cosied up together – but there are other basic elements they need to really thrive. They need calcium in spades, for example. They also need currents to spread their spat (larvae), but nothing so strong that the spat can't settle in. Angasi oysters do particularly well in a thriving ecosystem, in an intricate web of diversity. When all of these things are offered, an oyster reef can flourish and expand.

In the coastal waters of South Australia, there are two key bivalve species whose presence or absence can make or break an ecosystem. Together they provide the perfect substrate for other species to grow on and around, to hide in, to feed in, to rest in, to make a home. The angasi is one of these species. The other is the razorfish, or pinna (*Pinna bicolor*). A much larger bivalve growing up to 60 centimetres in length, it burrows into the sand, leaving most of its shell exposed. They cut a magnificent profile on the seabed, standing upright like the sails of a yacht filled with wind. Along with the angasi, their populations have been in decline on Kangaroo Island since European settlement, which means that the ability for other species to survive and thrive in this area has also been drastically reduced.





Ecologies operate in a graceful multi-species entanglement, a circular system of reliance

01 Jane Bamford in the studio making razorfish shell forms. She prototyped five clays, then settled on a porcelain and a stoneware. Jane made 1,000 forms over five months, for which the University of Tasmania gave her an artist-in-residency. Her work was supported by a grant from the Australia Council for the Arts. Image Peter Whyte

02 Members of the Kingscote Men's Shed making an improvised artificial oyster habitat from an old pallet and roof tiles. Image Alexandra Comino, courtesy Kangaroo Island Landscape Board

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There is a poetic balance at play here, because while these two species of shellfish flourish in a healthy ecosystem, that same ecosystem needs the shellfish to really prosper. Without the shellfish, the ecosystem is debilitated. This is generally how ecologies operate, in a graceful multi-species entanglement, a circular system of reliance. For a conservationist, it means that focusing on a single species is not really useful, or even possible, without also acknowledging and giving care to the species surrounding it.

Alex Comino demonstrates this expanded care when she explains the positive cascading effect that this project offers. With the return of the angasi and pinna reefs, a raft of other species look to benefit, including threatened and iconic syngnathids such as pipefish and leafy seadragons, numerous kelp species, other shellfish like scallops and mussels, recreational fishing species such as King George whiting and southern calamari, and a whole host of invertebrates from tube worms and blue swimmer crabs to octopus. In addition to this biodiversity boost, the return of the angasi and pinna will also mean an improvement in conditions for adjacent seabound communities like the nearby rocky reefs and seagrass meadows, the latter of which sequester huge amounts of carbon – a valuable trait in our rapidly changing climate. This project might seem humble now, but there may be many exciting benefits ahead. It's not surprising that Paul Jennings of the Kangaroo Island Landscape Board, whose brainchild this project is, refers to these shellfish as 'ecosystem engineers'. The project he envisioned is designed first and foremost to assist in the role that the shellfish play.

Members of the Kingscote Men's Shed have designed their own reef modules using recycled pallets and roof tiles

If this is not the story of a single species, neither is it the story of a single conservationist, a single scientist, or a single government working group. Like the ecosystem upon which it focuses, native oyster reef restoration on Kangaroo Island brings together a much larger cast of characters, led by Paul and Alex.

Jane Bamford, a Tasmanian ceramicist whose pieces are made almost exclusively for the non-human world and regularly straddle the line between art and conservation, has been brought on board to create clay forms that mimic the razorfish. In the past, Jane has worked on clay habitats for little penguins and the critically endangered spotted handfish, so her skills are well suited to this watery task. When grouped together in the coastal waters off Kangaroo Island, Jane's ceramic razorfish make for an organic, negatively buoyant, non-polluting and biosecure alternative to the real thing. Above water, these ceramic forms are stunning. With their creamy textures and graceful arching lines, their shape is something ancient and elemental. But it's under water, placed in the habitat for which they were made, that the forms really sit in communion with their surroundings, quickly attracting a colourful diversity of lifeforms, including the sought-after angasi oysters. Though she lives in another state, on another island, Jane visited Kangaroo Island before commencing her ceramic contributions, because connecting with place is a crucial part of the process for her. It goes without saying that her engagement with place includes engaging with community, both above the waterline and below it. She has now made over 1,000 of these pieces for the project, and her objectives are as clear as ever. Her contribution is a supportive one. The best-case scenario for this area will be the return of the real razorfish in healthy numbers. Until that happens, Jane's forms will go some way to supporting the regeneration of the ecosystem.



Oysters like to grow on oysters – they do best when cosied up together

01 Alex Comino diving on a bed of newly installed ceramic shells. Jane Bamford made forms in three slightly different concavities to enable the team to trial these variations.

02 Dead razorfish shells hosting various marine invertebrates, including some large, colourful sponges and old angasi oyster shells.

Images Stefan Andrews

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With the return of the angasi and pinna reefs, a raft of other species look to benefit

Along with Paul, Alex and Jane, a number of local community members have also come on board, bringing a diversity of skills and resources to the restoration. Members of the Kingscote Men's Shed, some of whom remember a time when the angasi were plentiful in the bays of Kangaroo Island, have designed their own reef modules using recycled pallets and roof tiles. Their solution is both creative and practical, using what's affordable and at hand. According to Alex, these modules are already proving effective – when it comes to alternative substrates, life under water is not discriminating. In addition to the Men's Shed, local business Kangaroo Island Shellfish offers the use of their vessels to deploy the reef modules. They also collect their own discarded oyster shells, which are then sun-cured and sprinkled onto the reef modules, creating a substrate that mimics the real oyster reefs and makes the modules more attractive to spat. There is evident pride in this voluntary work and great optimism for the future of the ecosystem.

All restoration and conservation projects start with uncertainty and a lot of study and labour is brought to bear with no guarantee of success. What's clear with this project is that it would not have much chance without the support, industry and knowledge of the local community. Their diverse inputs mirror the ecosystem they support, and this is entirely fitting because in a place like Kangaroo Island, where the idea of home extends beyond a person's four walls, and the idea of community includes a cornucopia of non-human lives, the sea and the coast have not only commercial value but cultural and social value too. That the word 'ecosystem' can be traced back to the word 'home' rings true here. It can be seen in the recovering non-human community below the surface, once again finding somewhere to settle. And it can be seen on land, where the Kangaroo Island community are doing everything they can to help restore the vulnerable environment they call home. Despite its uncertain outcome, this project demonstrates that conservation works best when it brings together a network of participants from varying walks of life, working collectively.

**Keely Jobe is a PhD candidate at the University of Tasmania. She lives by the sea on the east coast of lutruwita/Tasmania.**

For more information on this project, see [landscape.sa.gov.au/ki/native-plants-and-animals/oyster-reef-restoration](https://landscape.sa.gov.au/ki/native-plants-and-animals/oyster-reef-restoration)

Jane Bamford is a Tasmanian artist who has become known for creating functional forms in species support which embody creative problem-solving, functionality and compassion for the non-human world. Instagram @janebamford\_ceramics; website [janebamford.com](https://janebamford.com)

For articles on more ceramic artificial habitats created by Jane Bamford and other artists, see *Signals* 131, June 2020 (the critically endangered spotted handfish) and *Signals* 138, March 2022 (little penguins).