



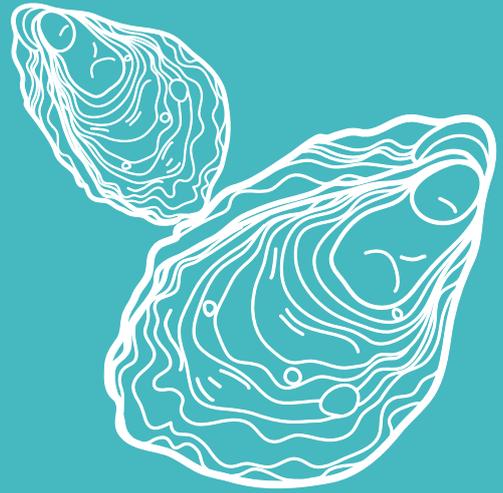
HEALTHY REEFS FOR HEALTHY COASTS

Re-establishing Adelaide's lost shellfish reefs to benefit the community, natural environment and local economy

More fish and cleaner water for South Australians to enjoy

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The project

Shellfish reefs once characterised the sheltered nearshore areas of South Australia.

But from the late 1800s to mid-1900s South Australian reefs suffered from the impact of overfishing, dredging, water pollution and disease. As a result, native oyster reefs are now absent from South Australia's waters, aside from the recently re-established Windara Reef off the coast of Ardrossan, on the Yorke Peninsula. Research has highlighted the importance of shellfish reef habitats to the quality of the marine environment, fish breeding, and water quality and to deliver recreational and economic opportunities.

A second shellfish reef for South Australia is now planned for Adelaide's metropolitan waters in the Gulf St Vincent. The South Australian Government has committed \$1.2 million towards building South Australia's metropolitan shellfish reef. This project is expected to be completed by late 2020.

The global conservation organisation, The Nature Conservancy, is leading the construction of the project, in partnership with the South Australian Department for Environment and Water.

The location for this new metropolitan shellfish reef now needs to be decided. We want public feedback on the preferred metropolitan location – out of three proposed

locations – for South Australia's second re-established shellfish reef. This feedback will help inform where the shellfish reef will be built.

The project is one of several initiatives being delivered as part of the South Australian Government's New Life for our Coastal Environment commitment. To find out more about the government's other initiatives visit environment.sa.gov.au/coasts.

How many shellfish reefs are in South Australia?

Shellfish reefs, with mainly Australian flat oysters (*Ostrea angasi*), were common in South Australia's gulfs and bays in the 1800s. Researchers estimate that they once spread across 1500 km of coastline.

Today, no native oyster reefs remain – mainly because of the impact of overfishing, dredging, water pollution and disease.

South Australia's first re-established shellfish reef – 20-hectare Windara Reef off the coast of Ardrossan – was completed in November last year.



Two million Juvenile Australian Flat Oysters (*Ostrea angasi*) will be used to build the reef © A. Nedosyko



TNC restoring shellfish reefs across southern Australia with project partners © A. Nedosyko

What are the location options?

Public feedback is now being sought on the location of the Adelaide Oval sized reef, which will be re-established in Adelaide metropolitan waters of the Gulf St Vincent.

Science and advice from experts have narrowed down the location options to three, they are:

1. Glenelg

Between Glenelg jetty and West Beach boat ramp

2. O' Sullivan Beach

Between Christies Beach and O'Sullivan Beach boat ramp

3. Port Noarlunga

Port Noarlunga jetty and Onkaparinga River mouth (within Encounter Marine Park-Port Noarlunga Sanctuary Zone)

All options will involve a reef being located over a two hectare footprint in approximately 5m to 12m depth of water and within 2 km from the shore. Refer to the site options maps for more detail on the proposed reef locations.

How were the location options selected?

A 70 km region of Adelaide's metropolitan coastline was assessed from Port Adelaide to Sellicks Beach. A spatial map of suitable areas was compiled, reviewed and refined by a team of restoration experts and marine scientists.

Three locations - Glenelg, O' Sullivan Beach and Port Noarlunga - were selected based on accessibility, water depth, seabed composition, cultural sensitivity, historical locations of shellfish reefs and current environmental conditions, all to ensure that the restored shellfish reef can grow and thrive.

Why does South Australia need more shellfish reefs?

Since European settlement, South Australia has lost almost all its Australian Flat Oyster (*Ostrea angasi*) reefs, a sad plight that has also occurred throughout southern and eastern Australia.

Research has highlighted the importance of shellfish reef habitats to the quality of the marine environment, fish breeding, and water quality and to deliver recreational and economic opportunities.

Shellfish reefs can be considered environmentally similar to their northern 'coral cousins'. The reef structure created by millions of living and dead oysters provides a hard surface for many marine animals to live on such as abalone, urchins, sea stars, sponges and sea squirts.

The small spaces in between oysters provide homes for many little critters that provide food for fish, octopus and squid. Without shellfish reefs, many of these species have no other place to live and the diversity and abundance of marine life declines.

Oysters are also excellent water filterers, when they feed they remove tiny particles made of nutrients and algae from the water. The return of millions of oysters, each filtering up to 100 litres of water a day, can help improve local water conditions and support the return of other ecosystems like seagrass.

The Nature Conservancy is working to restore oyster reefs throughout Australia including the 20 ha project near Ardrossan. For more information visit natureaustralia.org.au

Reef opportunities

The shellfish reef will provide:

Tourism and coastal businesses opportunities: this project will provide a new nature-based tourism destination right off the Adelaide metropolitan coast for those interested in kayaking, diving and learning more about the marine environment.

Community groups and individual opportunities: this project will provide citizen scientists and other volunteers another way to connect with South Australia's marine environment.

School and university educational opportunities: this project presents an exciting opportunity for students to learn first-hand about marine habitat restoration. Students can be involved in research, monitoring and other citizen science activities that will directly improve South Australia's understanding of shellfish reef restoration.

Recreational and commercial fishing opportunities: this project will build a habitat that supports fish breeding in South Australian waters. Note: fishing will not be allowed for the first few years while the reef grows and establishes ecologically.



What a restored oyster reef looks like at Georges Bay, Tasmania © C. Gillies



A clump of remnant native oysters on a razorfish clam in the Gulf St Vincent © J. Fitzsimons

1 OYSTER CAN FILTER AROUND A

 **Bathtub**

OF SEAWATER PER DAY - IMAGINE MILLIONS PUT BACK INTO OUR GULFS

EVERY YEAR, 1 HECTARE OF REEF WOULD FILTER

 **2.7 billion**

LITRES OF WATER AND REMOVE

 **225kg**

OF NUTRIENT POLLUTION (NITROGEN AND PHOSPHORUS) AND ADD

 **375kg**

OF ADDITIONAL FISH INTO THE GULF

SHELLFISH REEFS PROVIDE NEW HOMES TO OVER

 **100 marine species**

INCLUDING SNAPPER, CRABS, SHRIMPS, WHITING, ABALONE, CUTTLEFISH, SQUID AND SCALLOPS

How will the reef be built?

Shellfish reef construction involves placing limestone rocks and recycled oyster shells onto the seafloor to provide elevation and hard calcareous surfaces for oysters to attach.

The 2 to 4 hectare shellfish reef will be constructed using a limestone reef base, with hatchery raised Australian flat oysters. Once in place, the reef base will be seeded with millions of baby oysters, called oyster spat. The oyster spat are collected from local oysters spawned in a hatchery and set onto recycled shells.

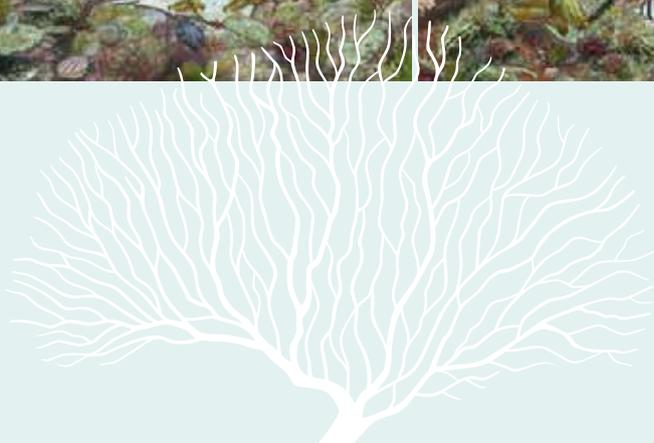
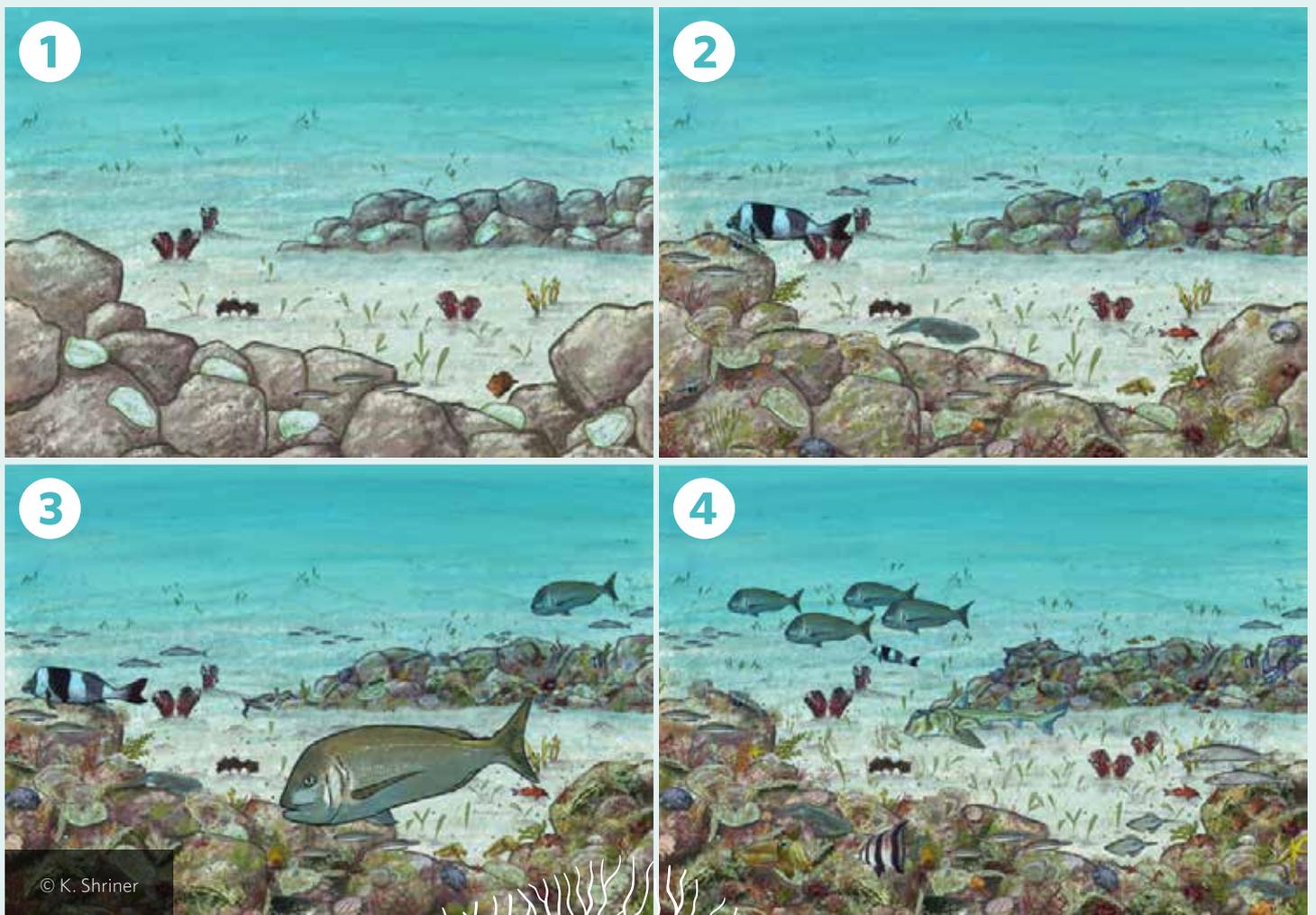
These shells are then deployed by divers onto the reef base. To watch a video of how the reef is created visit here <https://youtu.be/uw5XMxe1QOk>

The reef will be built in around 5 to 12 m depth of water, within 2 km of the shoreline. The exact reef design will depend on the final selected location.

Stages of reef development

Figure 1: Stages of shellfish reef development

- 1 In the first year, limestone substrate is laid on the seafloor and 'seeded' with juvenile native oysters (called spat) attached to recycled oyster shell
- 2 By the third year, spat grows and develops into larger oysters that spawn and increase the shellfish population on the reef
- 3 By the fifth year, the reef is attracting a range of marine species thanks to the food and shelter provided by the reef
- 4 By seven years and then beyond, the diversity and number of marine species increases as the reef acts as a nursery ground for fish, squid and crustaceans. The reef supports a diverse, productive and healthy marine habitat for the long-term.





Shell cleaning and bagging process with volunteers at Coffin Bay for Windara Reef © A. Nedosyko



Key Considerations

- The reef is expected to be completed by late 2020.
- The reef will take time to grow and mature. After 10 years the reef will become a diverse and abundant natural ecosystem.
- Some fish species will be attracted to the reef in the short-term. Once mature, the reef will become an important fish nursery ground.
- Harvesting of oysters from the reef will not be permitted at any stage. This is to protect the oysters and allow the reef to thrive.

For more information visit www.environment.sa.gov.au/coasts



First 1400T of limestone rock constructing Windara Reef, Yorke Peninsula A. Bolton



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