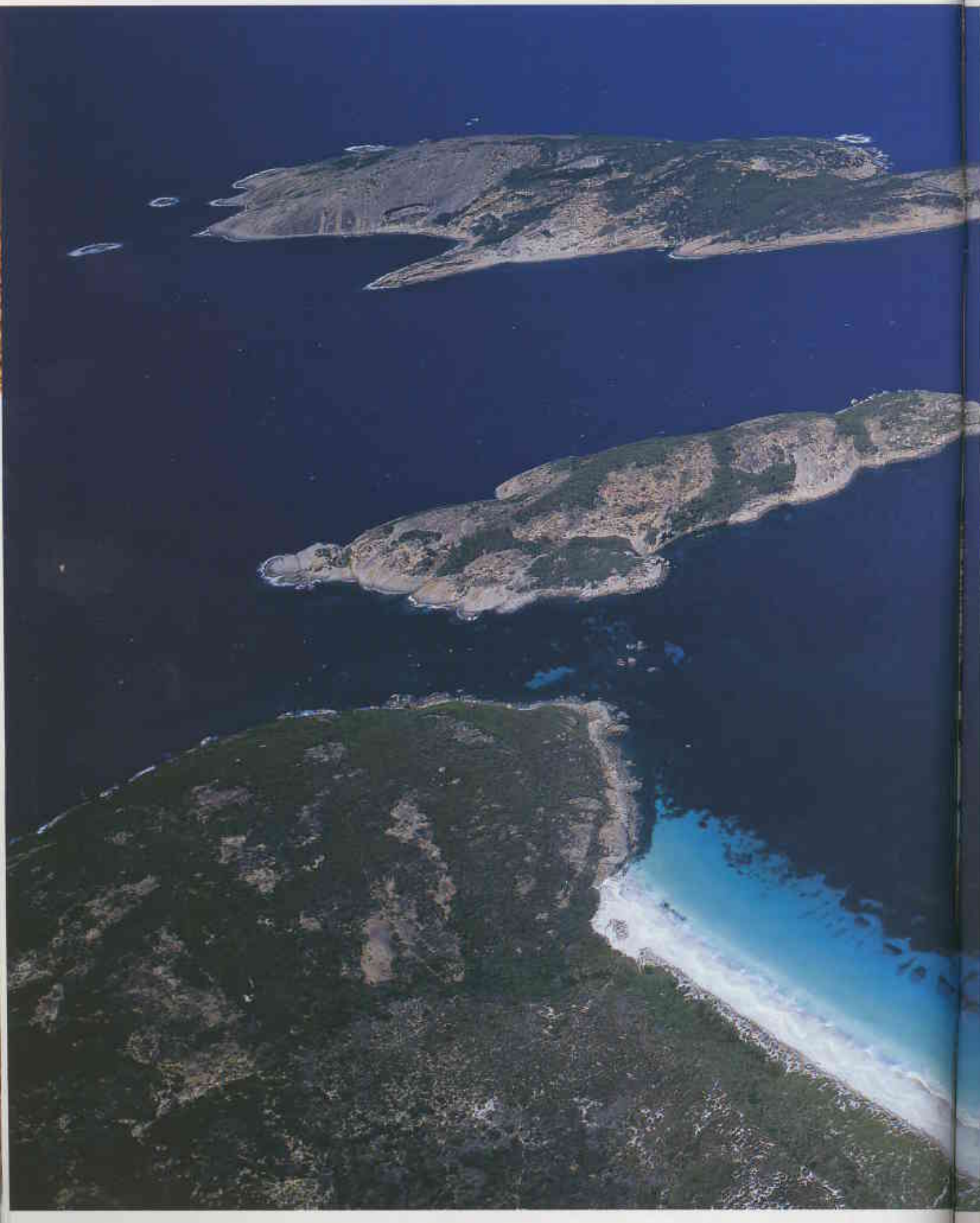


Researching the Recherche

Exciting marine research has begun in one of Western Australia's most beautiful and little known areas of underwater wilderness.

by Carolyn Thomson-Dans, Gary Kendrick and Kevin Bancroft

The magnificent Archipelago of the Recherche stretches for more than 200 kilometres along the State's southern coastline, offshore from Esperance, and contains more than 100 islands and 1,500 islets.

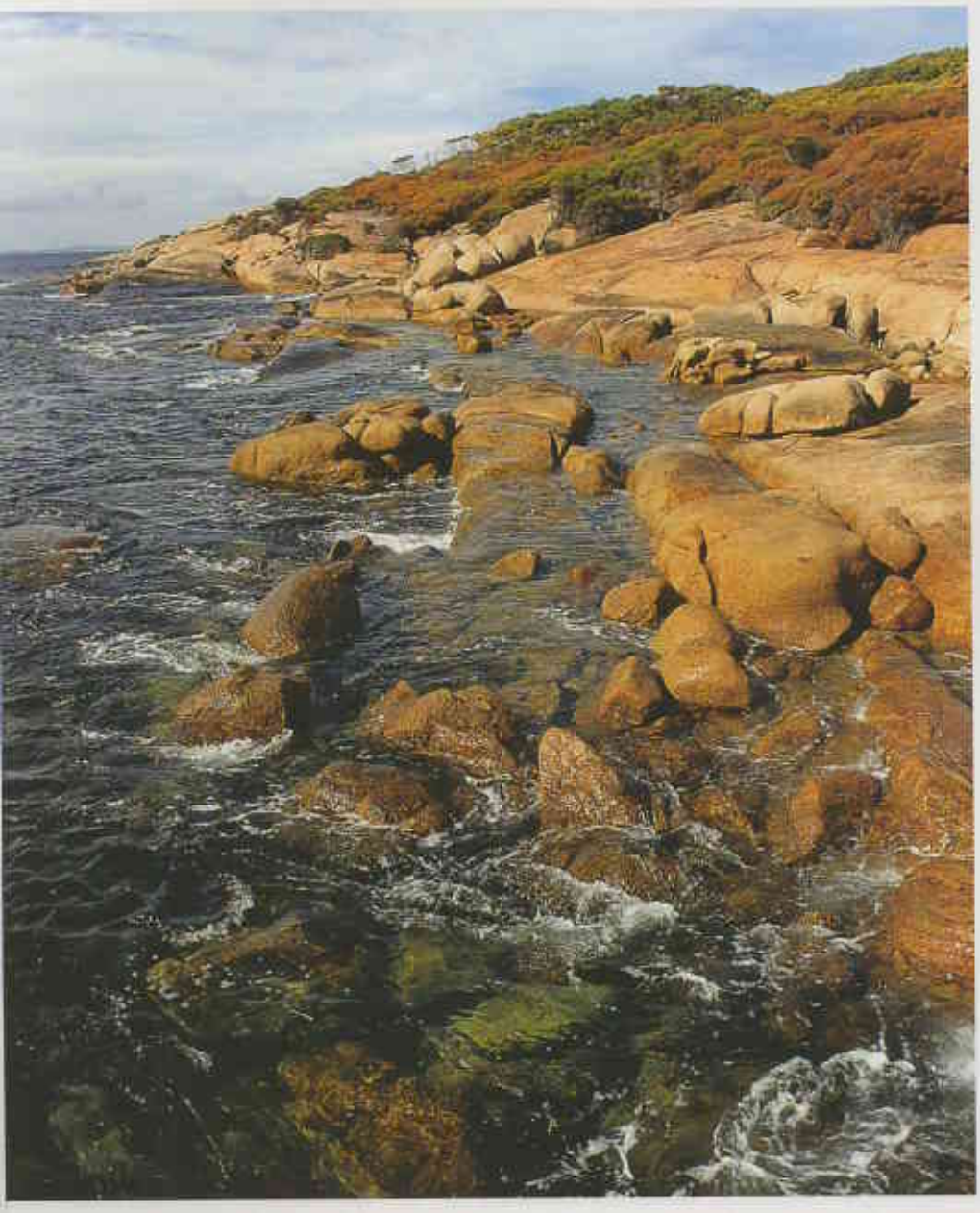
The islands represent the high points of an ancient land surface that is now flooded by the ocean. Most of the islands are exposed to high or moderate wave action from all directions and there are few safe anchorages or landings. In form and character, the islands—which are mostly inaccessible—resemble the granitic headlands of the mainland coast. In the most exposed areas, smooth, steep-sided, rocky slopes plunge into the sea. More sheltered bays have boulders and tide pools. Between some of the headlands there are beaches backed by low dunes or granite slopes. The depth of the sea floor within the archipelago averages about 40 metres, although the outer islands rise from depths of 70 metres or more.

Use of the area

In 1627, Pieter Nuyts on the Dutch vessel *Gulden Zeepard* ('Golden Seahorse') passed through the archipelago, but did not land in the area. The next arrival was Captain George Vancouver, on the *Discovery*, who ventured through the still-nameless archipelago in October 1791. In 1792, *L'Esperance* and *La Recherche*, two French vessels under the command of Rear Admiral Bruny D'Entrecasteaux, were forced to seek shelter on the Esperance coast from a storm, conferring the name of one of their vessels on the spectacular island group. In 1802, Matthew Flinders, aboard the *HMS Investigator*, became the first to explore and chart the region. During the nineteenth century, sealers from the penal settlement at Van Diemans Land arrived, followed by American and French whalers.

Today, the lower rock slopes of the islands are important commercial fishing areas for greenlip and brownlip abalones. Gummy sharks, whiskery sharks and dusky sharks (bronze whalers) are extensively fished by net and long line in these waters. The waters of the archipelago also support a large proportion of the fishery for the southern rock lobster. A small trawl fishery for saucer scallops also operates seasonally within the area, and there is a regionally important, developing fishery for pilchard.

Woody Island is the only readily accessible island close to Esperance in the archipelago. It is also the only one on which overnight accommodation is available.



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Main New Island (centre) and Ram Island (top) offshore from Cape Le Grand National Park.
Photo – David Bettini
Insets (left) Information collected during a major study of the Recherche Archipelago will aid the planning of a marine conservation reserve.
(right) Sea slug on an encrusting sponge.
Photos – Justin McDonald

Left Woody Island is one of few islands in the archipelago that receives regular visitors.
Photo – Jiri Lochman

The coastal waters, islands and marine life provide a drawcard for boating, diving and fishing. Awesome, but gentle, southern right whales visit the bays and sheltered inlets, between July and November, to calve. They can be viewed from vantage points on land or by boat. Divers can experience crystal clear waters, diverse underwater life, cathedral-like caves, reefs and shipwrecks, including that of the *Sanko Harvest*, which ran aground on Harvest Reef 12 nautical miles off Esperance, on 14 February 1991. The region is an angler's paradise, with snapper, salmon, herring and other popular species readily caught from beaches, jetties or boats. But, given increased pressures for development in this lovely spot, how much longer can it stay that way?

Conservation values

All of the islands in the archipelago are nature reserves. Many of the islands and emergent rocks in the archipelago are used as haul-out sites and breeding areas by Australian sea lions and New Zealand fur seals. The breeding colonies include the largest in the State for both species. There are also important nesting areas for the little penguin and the Recherche Cape Barren goose on several of the islands.

In depths below 20 metres, there are spectacular growths of attached invertebrates, especially sponges. Fish communities in the area are very diverse and even residential species like blue groper and queen snapper, which are extremely vulnerable to fishing pressure, are abundant.

Top Lake Hiller on Middle Island.
Photo – David Bettini

Above Underwater animals such as sea squirts and plants densely coat rock surfaces.
Photo – Justin McDonald

In June 1994, the Marine Parks and Reserves Selection Working Group in their report *A Representative Marine Reserve System for Western Australia* examined the values of the archipelago, but was hampered by lack of information. More than 30 years before, members of the Australian Geographic Society Expedition had published the only studies on the marine plants and animals that inhabited the archipelago. Even so, the report concluded that 'reservation of the entire area as a multiple-use marine reserve is warranted'. The Marine Parks and Reserves Authority, the vesting body for marine conservation reserves, subsequently identified the Recherche Archipelago as being of high priority for reservation. New research projects aim to reverse the dearth of information.

New research

In 1999, the Department of Conservation and Land Management's Marine Conservation Branch successfully

applied for funding through the Marine Protected Areas Program of the Natural Heritage Trust (NHT). The project involved mapping major marine habitats and the marine wildlife distributions of the area, as well as developing a preliminary understanding of the physical oceanography of the region. This project has involved staff from the department's Marine Conservation Branch and its Esperance District Office as well as scientists from The University of Western Australia (UWA) and was directed at obtaining some of the information needed for the planning of a marine conservation reserve in the area.

Top left Leafy seadragons inhabit the Recherche Archipelago. These fish are protected as their removal might lead to the species disappearing from an area.
Photo – Peter & Margy Nicholas/Lochman Transparencies

Above The lower rock slopes of the islands are important commercial fishing areas for greenlip abalone.
Photo – Eva Boogaard/Lochman Transparencies

Centre left Translucent red sea squirts growing on the tube of a tubeworm.

Left Giant western blue groper have disappeared from most heavily-fished parts of our coast, but are still seen in the Recherche Archipelago.
Photos – Gerhard Saueracker/Lochman Transparencies

Top Submerged granite walls are covered by invertebrates such as this fan-shaped hydroid.
Photo – Justin McDonald

Above The aptly-named harlequin fish.
Photo – Gary Kendrick

Last year, a consortium consisting of scientists from UWA, with assistance from local commercial fishermen, tourism operators and community groups, began a detailed three-year study of the benthic (sea floor) communities of the archipelago. The project is funded by the Fisheries Research and Development Corporation and UWA, and will build on the NHT-funded work done by the department, by examining the factors influencing the distributions of benthic marine communities in this area.

In October 2002, a team of 11 researchers spent four weeks surveying the distribution and abundance of habitats, seaweeds, invertebrates and fish on subtidal granite reefs in inshore and offshore islands in the western part of the archipelago.

This data forms the biodiversity component of the Fisheries Research and Development Corporation-funded fish-habitat mapping exercise presently under way in the archipelago. It is also supported strongly by the local community through the Recherche Advisory Group, an Esperance community driven coordinating organisation, the local commercial and recreational fishing groups, and cash grants from the Esperance Port Authority, Black Swan Nickel, Portman Mining and MG Kailis. The Department of Conservation and Land Management also assisted this project in many ways: including the provision of support and accommodation from its Esperance District Office, and financial and scientific support for their survey undertakings have been provided by the department's Marine Conservation Branch and the NHT.

The team consisted of Dr Gary Kendrick (coordination and seaweeds), Nisse Goldberg (seaweeds), John Heine (seaweeds), Dr Justin McDonald (leader invertebrates), Dave Abdo (invertebrates), Simon Grove (invertebrates), Dr Euan Harvey (coordination and fish), Dave Gull (fish), Nicole Harman (fish), Andy Bickers (sidescan sonar and towed video) and Katrina Baxter (GIS and spatial design). Visiting the islands further offshore necessitated using a much larger vessel, a local dive charter called the *Southern Image*. The assistance given by its crew and divemaster made the task all that much easier.

Over the time of the survey, ocean conditions ranged from warm and calm to 50-knot gales, adding to the unique experience the researchers had already had from the diversity and beauty of the underwater landscapes they visited.

The team studied the distribution and abundance of seaweeds, and

attached invertebrates, such as sponges, sea squirts, bryozoans, hydroids and fish on sheltered and exposed locations on groups of inshore and offshore islands. They sampled at 5–10 metres, 15–20 metres and greater than 20-metre depths at all locations. Their inshore locations were Black, Woody and Thomas islands and the offshore islands were Long, Remark and Frederick.

Once this survey was completed, a study of the differences in distribution and abundance of seaweeds, attached invertebrates and fish were further investigated, on sloping granite and vertical drop-offs at 15 to 20 metres in depth, at Mondrain and Figure of Eight islands.

High-tech heaven

During the course of the survey the research team utilised amazing high-technology research techniques to identify and map sea floor habitats. They used hydroacoustics (the use of sound in water) by which a depth sounder measures the time it takes for a pulse of sound to reflect off the bottom and back to the boat. This technique can be used to determine both the depth and the type of habitat present on the sea floor. A sidescan sonar—with two fan-shaped beams generated by transducers—mounted on a 'tow fish' behind the boat can be used to build up a geo-referenced image if you continue to go back and forth. This is excellent for mapping habitat transitions around coastlines and islands. It is so sophisticated that it can pick up individual boulders and seagrass plants to a five-centimetre resolution. One of the interesting habitats recorded were vast beds of rhodolith—a type of calcareous alga that looks like pebbles.

However, the researchers still needed some way of ground truthing

Above left Rugged conditions make many islands in the Recherche Archipelago fairly inaccessible.

Left Many of the islands are important breeding areas for Australian sea lions.
Photos – Jiri Lochman

Right Kelp (*Ecklonia radiata*) attaches its stem to the reef by means of a 'holdfast'. *Photo – Clay Bryce/Lochman Transparencies*

these data, and this was achieved using video. Two types of underwater video systems were used, both of which can be deployed either by a diver or remotely. For towed video cameras, the researchers developed software that overlayed Global Positioning System (GPS) and depth data onto videotape.

Dr Euan Harvey sampled fish using stereo videography that he has been pioneering over the past six years. This method is non-destructive and very appropriate for surveying and monitoring in marine parks. The fish became more abundant and larger the further they went offshore, with some blue gropers they encountered being 1.5 metres in length. It was also evident that the fish populations varied with the depth and that there were different combinations of fish living on the more exposed side of the islands, compared with on the more sheltered sides.

Early results

It seems that—in terms of finding new species—the survey has already struck gold. They have collected video of six species of fish that they are unable to identify using currently published material. Most of these are small wrasses living among the kelps. It also seems that there are five or six new species of algae. More amazingly, of the 300 to 400 species of sponges that were collected, around 40 to 50 per cent are likely to be species new to science.

The research team still has many months of work ahead of them, analysing the collections and videotapes. An extended survey in April and May 2003 incorporated more fine-scale collection work by divers.

The future

The Western Australian Museum recently held an International Marine Biological Workshop in Esperance. Over a two-week period, more than 20 local and international scientists undertook intensive ecological, biological and taxonomic research in the nearshore waters of the archipelago, further adding to the rapidly increasing knowledge base for the area.

The Cooperative Research Centre for Coastal Zone, Estuary and Waterways Management (Coastal CRC) has been successful in attracting $3 million in supplementary funding from the Commonwealth Government. The seabed and estuarine habitat project will be developed by the Coastal CRC in collaboration with Curtin University, UWA, Defence Science and Technology Organisation, the Department of Conservation and Land Management, SonarData, Reson, Fugro Survey and the Georeality Group. The project will develop a toolkit of state-of-the-art techniques for mapping, identifying and classifying seabed habitats, data interpretation and visualisation techniques, and an education and training program. The Recherche Archipelago is one of the Coastal CRC project's key study areas.

The results that flow from the current and proposed marine research activities in the Archipelago of the Recherche will substantially boost our knowledge and, ultimately, the conservation of this unique and beautiful area of Australia.

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