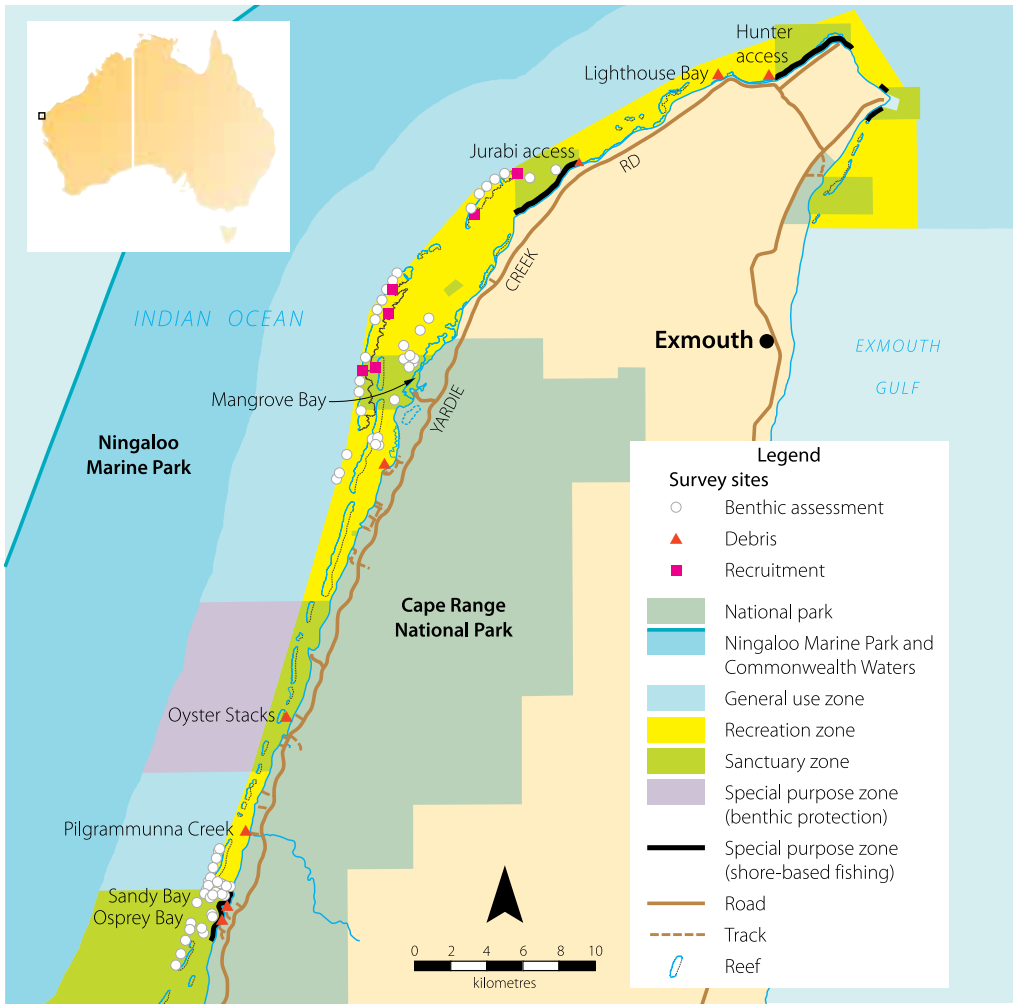
Waste free: protecting pristine Ningaloo reef

A CSIRO study into rubbish at Ningaloo has revealed the World Heritage-listed area is living up to its pristine reputation.

by Damian Thomson and Peter Barnes

At 300 kilometres long, Ningaloo Reef is Australia's largest fringing coral reef. It has long been important to the Baiyunga and Jinigudira people and, today, its turquoise water and pristine sand make it popular among snorkellers, scuba divers and paddlers who travel there to take in its natural beauty and observe the area's rich marine life. Visitors can marvel at the more than 500 species of tropical fish and 200 species of coral, as well as the whales, dolphins, dugongs, manta rays, turtles and whale sharks that occur there. And the annual mass coral spawning – a three-day event that occurs after the full moon in March and April – is a sight to behold. There are also several historic shipwrecks to explore and the area is popular for surfing, fishing and boating. But, like so many other natural areas, the Ningaloo Coast World Heritage Area is in danger of being 'loved to death' – its natural values being compromised by the visitors who, ironically, come to enjoy them – if it is not appropriately managed. And the area is also at risk of being polluted by rubbish that arrives there as a result of a much bigger global problem.



Previous page
Main CSIRO researchers have surveyed more than 35 kilometres of Ningaloo reef.
Photo – Damian Thomson/CSIRO
Inset Debris that washed ashore was collected and catalogued as part of the survey.
Photo – Damian Thomson and Dan Orr/CSIRO

THE SURVEY SAYS …

In 2015 researchers from CSIRO embarked on a study to survey the Ningaloo Reef and nearby coastline to examine the amount of rubbish present. The program – called *Ningaloo Outlook* – is a strategic partnership between CSIRO and BHP that aims to carry out research relating to the Ningaloo Coast World Heritage Area. The program will be carried out over five years and aims to increase our understanding of Ningaloo's deep and shallow reefs and the iconic turtle and reef and whale shark populations.

Since the beginning of the study, researchers from CSIRO have surveyed more than 35 kilometres along the reef using SCUBA and 60 kilometres of the beach on foot. Divers recorded debris in the water at 63 locations along the reef in five by 25-metre transects in May 2016, 2017 and 2018. The debris found was recorded under five categories: fishing lines, fishing hooks, fishing sinkers, plastics and 'other'. Land-based debris was recorded on beaches adjacent to the in-water debris survey locations. Eight intertidal beach locations were surveyed: at Lighthouse Bay, Hunter access, Jurabi access, Mangrove Bay (Mesa Camp), Oyster Stacks, Pilgrammunna Creek, Sandy Bay and Osprey Bay. Land-based debris was recorded using a modified version of the CSIRO land-based debris project methodology. At each location the access point on the beach was recorded using a GPS. The date, observer, weather conditions, wind speed, wind direction and the number of human visitors either in the water or on the beach were recorded. All debris bigger than one centimetre was then recorded within a 10-metre-wide transect from the water's edge to the fore dune (five metres left and five metres right). The size, colour, type and estimated age of the debris was recorded, and if the debris had a legible barcode, a photo of the barcode and the item was captured. Each transect was separated by at least 100 metres to maximise the area of beach surveyed. The observer continued to survey five metres each side of the high-tide line while traversing between transects. Conditions that influenced the amount of debris present on the beach, such as the profile of beach, wind strength, wind direction, visibility and the level of cloud cover, were also recorded.

Top Fishing line and sinkers were two of the most commonly collected items.

Above A suspected vessel fender was also found.

Above right Researchers established 25 by five-metre transects.
Photos – Damian Thomson/CSIRO

Below right Whale sharks frequent Ningaloo Marine Park.
Photo – Gary Bell/Oceanwide Images

Survey results indicated the reef and beaches at northern Ningaloo contain very low density of debris with an average of less than two items per hectare. The most number of items was observed at Lighthouse Bay (3.89 items per hectare), followed by the Osprey Bay boat ramp (3.75 items per hectare) and Oyster Stacks (2.5 items per hectare). The least amount of debris was observed at Sandy Bay and Jurabi (1.25 and 1.2 items per hectare respectively), which also had the least number of people recorded in the water or on the beach at the time of survey. A recent national CSIRO study estimated there were more than five pieces of litter along the coastline for every person living in Australia. Of the rubbish found floating offshore, more than 90 per cent was plastic. However, the amount of rubbish present on the Ningaloo shoreline was incredibly low, particularly when compared to other Australian beaches. And the amount of marine debris on the reef was well below those recorded for many coral reefs worldwide.

"A recent national CSIRO study estimated there are more than five pieces of litter along the coastline for every person living in Australia."

While you may expect to see a reduced amount of rubbish in an area that only a lucky few call home, Ningaloo's local population is 0.9 per cent of Melbourne's, but Port Melbourne's beaches had 500 times the amount of rubbish as Ningaloo's northern beaches. And, the Sunshine Beach in Queensland had more than 350 times the rubbish. But we didn't have to look too much further than the local community to discover why this was.

COMMUNITY SPIRIT

On the whole, the residents of Exmouth have a strong desire to keep their local beaches and reefs clean and clear of rubbish and debris. It is a cultural habit that locals collect rubbish they find along the beach as they're enjoying their daily walk, and there are a number of organisations, such as Sea Shepherd and the Cape Conservation Group, that organise and facilitate regular clean-ups, especially at spots like Jane's Bay – a marine debris hotspot. Volunteers are also on the lookout for rubbish when they are taking part in targeted projects such as turtle monitoring for the four to five weeks between October and February each year.

Protecting an icon

In 2011, the World Heritage Committee inscribed Ningaloo Coast on the World Heritage List to recognise the area's outstanding diversity and abundance of marine life, its amazing cave fauna and the spectacular contrast between the underwater wonderland and the arid and rugged landscape of Cape Range National Park.

The Ningaloo Reef is protected within Ningaloo Marine Park. Thirty-four per cent of the marine park is protected in sanctuary zones, which are areas designated for people to visit and 'look but don't take'. This protects the pristine underwater habitat and marine wildlife and will help to provide a benchmark for evaluating the health of other areas in the marine park, which are open to fishing.

The 'Leave No Trace' approach to waste management in Cape Range National Park also encourages visitors to take responsibility for their rubbish while visiting the area. There are no rubbish bins in the park, which means people must take out what they bring in with them. And, thankfully, most visitors meet this expectation.

ONGOING PROCESS

Despite these pleasing results, Ningaloo coast is by no means immune to the effects of rubbish, and a 'debris event' in 2017, when a large amount of floating debris (or a 'plastic soup' as it was known) was detected off the coast and then washed up onto the beaches, was a stark reminder of the importance of ongoing vigilance. It was speculated that an industrial ship dumped the rubbish into the ocean instead of paying for it to be disposed of appropriately in port. Of course, this type of behaviour is short sighted; marine debris is a global issue and impacts every country that has coastal environments. And, in the end, we all pay for rubbish that's disposed of inappropriately.

Fortunately, the local community stepped up to the plate and demonstrated their commitment to keep the area clean. DBCA relied on the reports of local boaters and tour operators, who provided information about where they saw plastic in the ocean; the local school helped with beach clean-ups; local volunteers assisted with sorting plastics and DBCA worked with the Department of Primary Industries and Regional Development to identify any biosecurity risks from introduced animals and algae that might have hitched a ride on the plastics.

Rubbish that is polluting our oceans and beaches impacts tourism, fisheries, aquaculture, human health and the wellbeing of our marine life. Studies such as the one carried out by CSIRO to understand potential impacts on this World Heritage-listed area will inform industry, government and the community, and highlight the importance of protecting our ocean's natural resources.

Above left Visitors to Cape Range National Park, including to Osprey Campground, are expected to follow the 'Leave No Trace' principles.
Photo – Tourism WA

Below Convict surgeonfish can be found along Ningaloo reef.
Photo – Hayley Versace/Oceanwide Images

Damian Thomson is the leader of CSIRO's *Ningaloo Outlook* Shallow Reefs program. He can be contacted by email (damian.thomson@csiro.au).

Peter Barnes is DBCA's Exmouth District marine program coordinator. He can be contacted on (08) 9947 8000 or by email (peter.barnes@dbca.wa.gov.au).

For more information about Ningaloo Marine Park and Cape Range National Park, visit parks.dpaw.wa.gov.au

The authors would like to acknowledge the Developing a baseline estimate of amounts, types, sources and distribution of coastal litter – tan analysis of US marine debris data. *(CSIRO: EP167399) by Hardesty D, Wilcox C, Schuyler Q, Lawson TJ and Kimberley Opie for information that went into this article.*