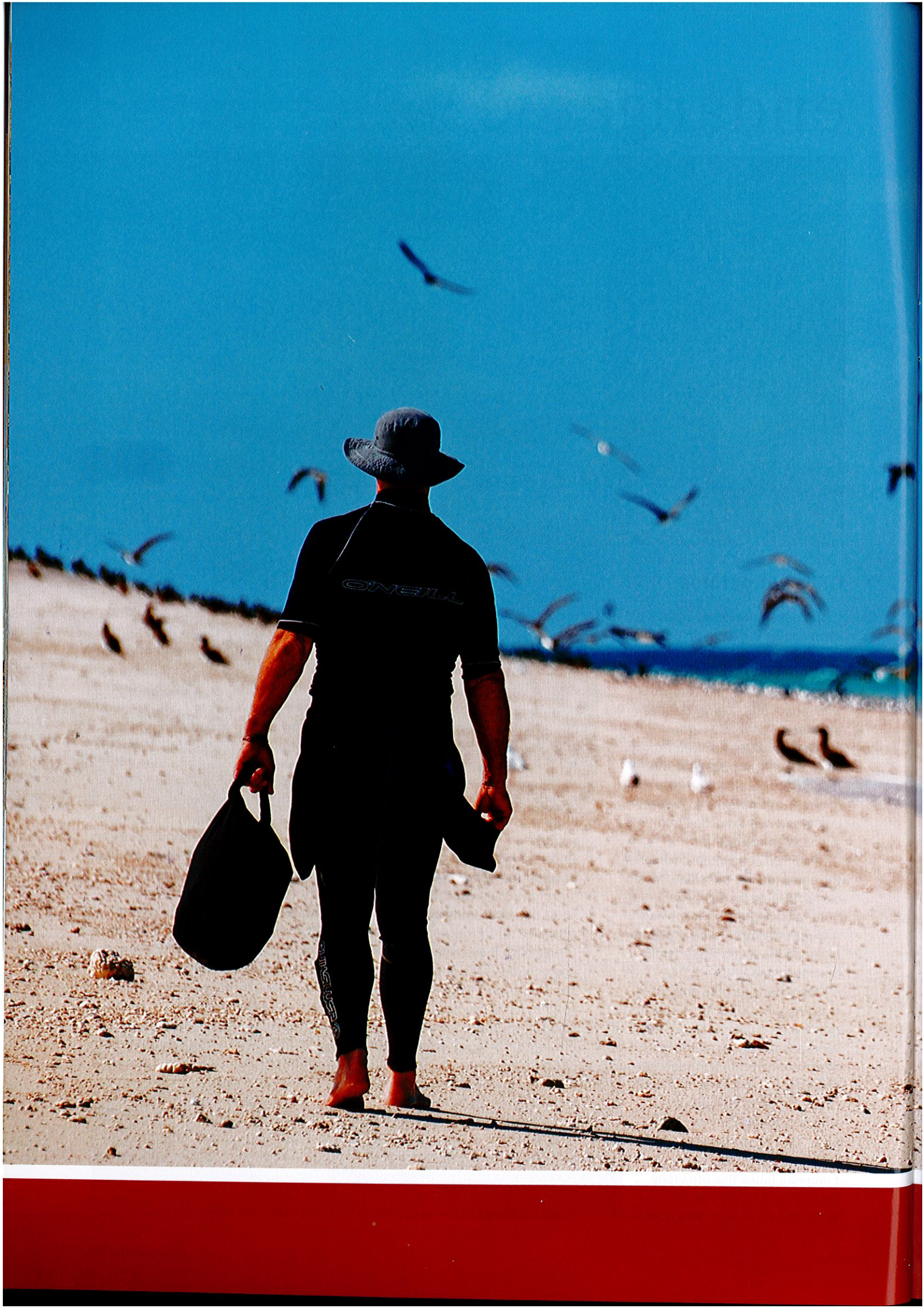
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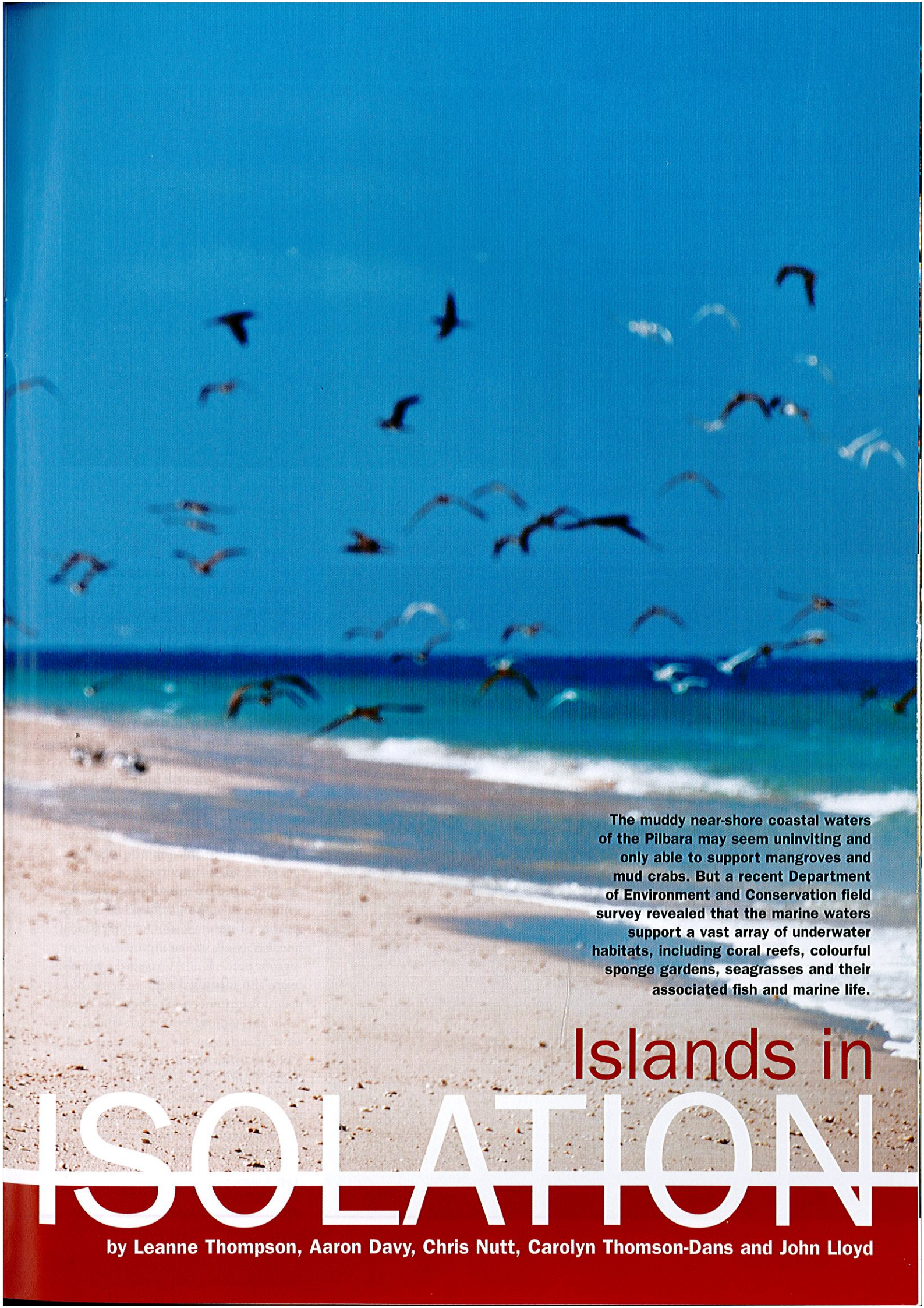


The muddy near-shore coastal waters of the Pilbara may seem uninviting and only able to support mangroves and mud crabs. But a recent Department of Environment and Conservation field survey revealed that the marine waters support a vast array of underwater habitats, including coral reefs, colourful sponge gardens, seagrasses and their associated fish and marine life.

Islands in ISOLATION

by Leanne Thompson, Aaron Davy, Chris Nutt, Carolyn Thomson-Dans and John Lloyd

How do you plan marine parks and reserves along a vast stretch of Western Australia's coastline that has not been comprehensively surveyed? That was the dilemma that faced marine conservation planners from the Department of Environment and Conservation (DEC) when they were given the task of recommending a network of marine parks and reserves in the Pilbara and lower west Kimberley (Eighty Mile Beach) region (see 'Pilbara and Eighty Mile Beach: multiple objectives, one marine planning process', *LANDSCOPE*, Autumn 2008).

The Pilbara region has many special marine environments, including those in existing marine parks and reserves at the Montebello Islands Marine Park, Barrow Island Marine Park and Barrow Island Marine Management Area. However, other study areas in the Pilbara and lower west Kimberley region were also identified for further investigation to see if they should also be included in the marine parks and reserves system. The study areas included the waters surrounding the Great Sandy Island Nature Reserve and Mary Anne and Mangrove islands, the Robe River mangrove system, Cowrie Beach, the offshore islands of the De Grey River area, Cape Keraudren and Eighty Mile Beach.

Many of the sandy beaches in these areas support some of the world's most important turtle nesting rookeries, including those of the threatened flatback turtle, which only occurs in northern Australia. Pilbara and lower west Kimberley waters are also home to several other threatened species, including green turtles, hawksbill turtles, loggerhead turtles, green sawfish and specially protected marine animals such as dugongs and several shorebird species protected under international agreements.

Preliminary work

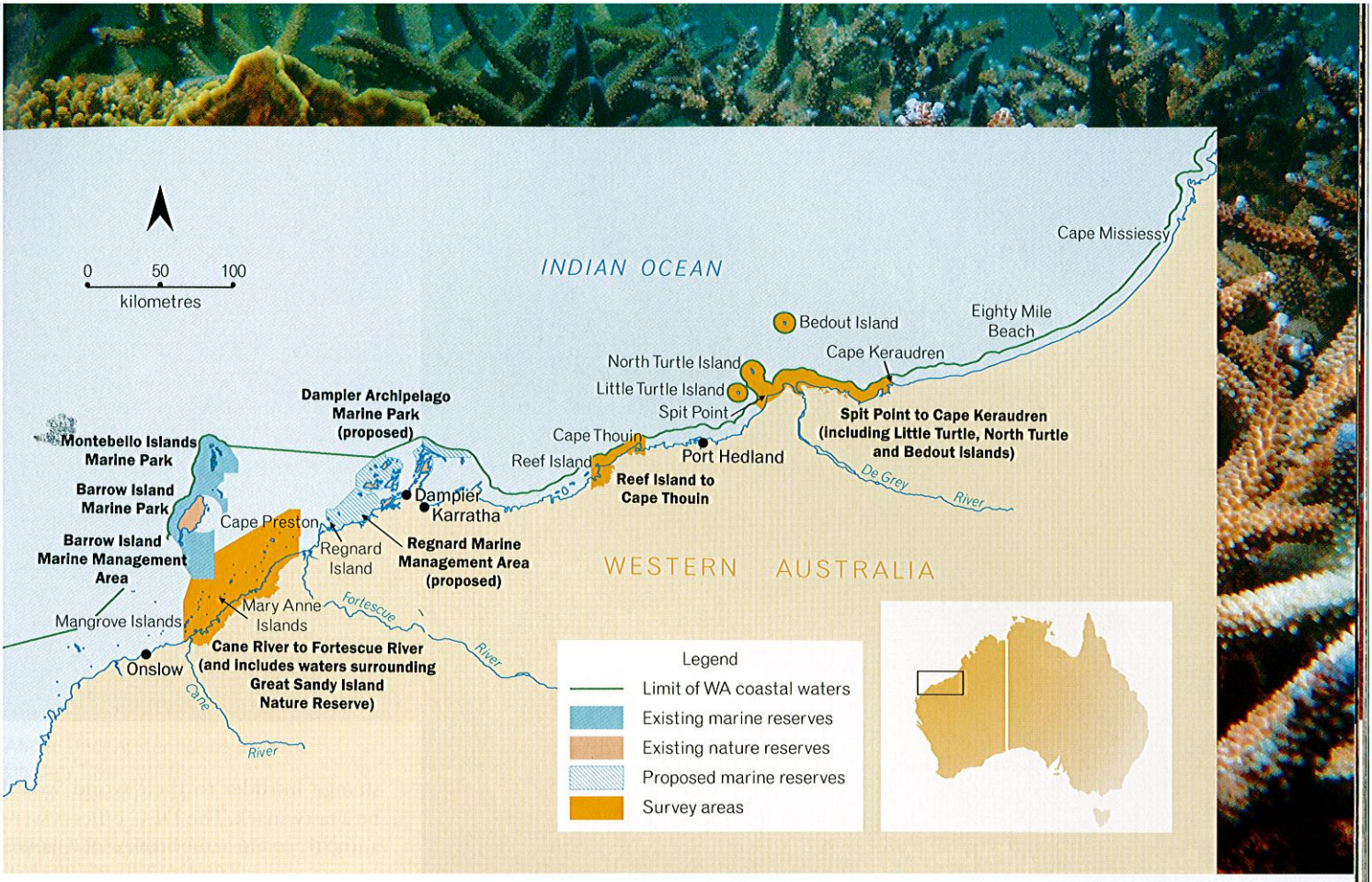
Planners first undertook an assessment of the ecological and social values in this extensive and physically complex area, including gathering available ecological data and information on human use and cultural sites of importance. Their investigations identified areas of nationally and internationally important mangroves and wetlands, as well as information on other types of habitats that occur in the region—such as coral reefs, seagrass meadows and sponge gardens, as well as the animals that depend on the habitats.

Through their research and the Government Interagency Working Group, the planners identified commercially important areas for mining and petroleum industries, commercial fishing, aquaculture and pearling. Important sites for recreational use, as well as numerous sites of significance for Aboriginal people, were also identified.

Previous page
Main The isolated Bedout Island.
Photo – Leanne Thompson/DEC

Above Islands in the Mary Anne group are in the study area.
Photo – David Bettini

Left A lagoon ray in the waters of the Great Sandy Islands.
Photo – Leanne Thompson/DEC



Above background Staghorn coral.
Photo – Leanne Thompson/DEC

Right Coral trout.
Photo – Alex Steffe/Lochman Transparencies

This preliminary work is essential as any network of marine parks and reserves which are proposed will need to address conservation, commercial and recreational objectives.

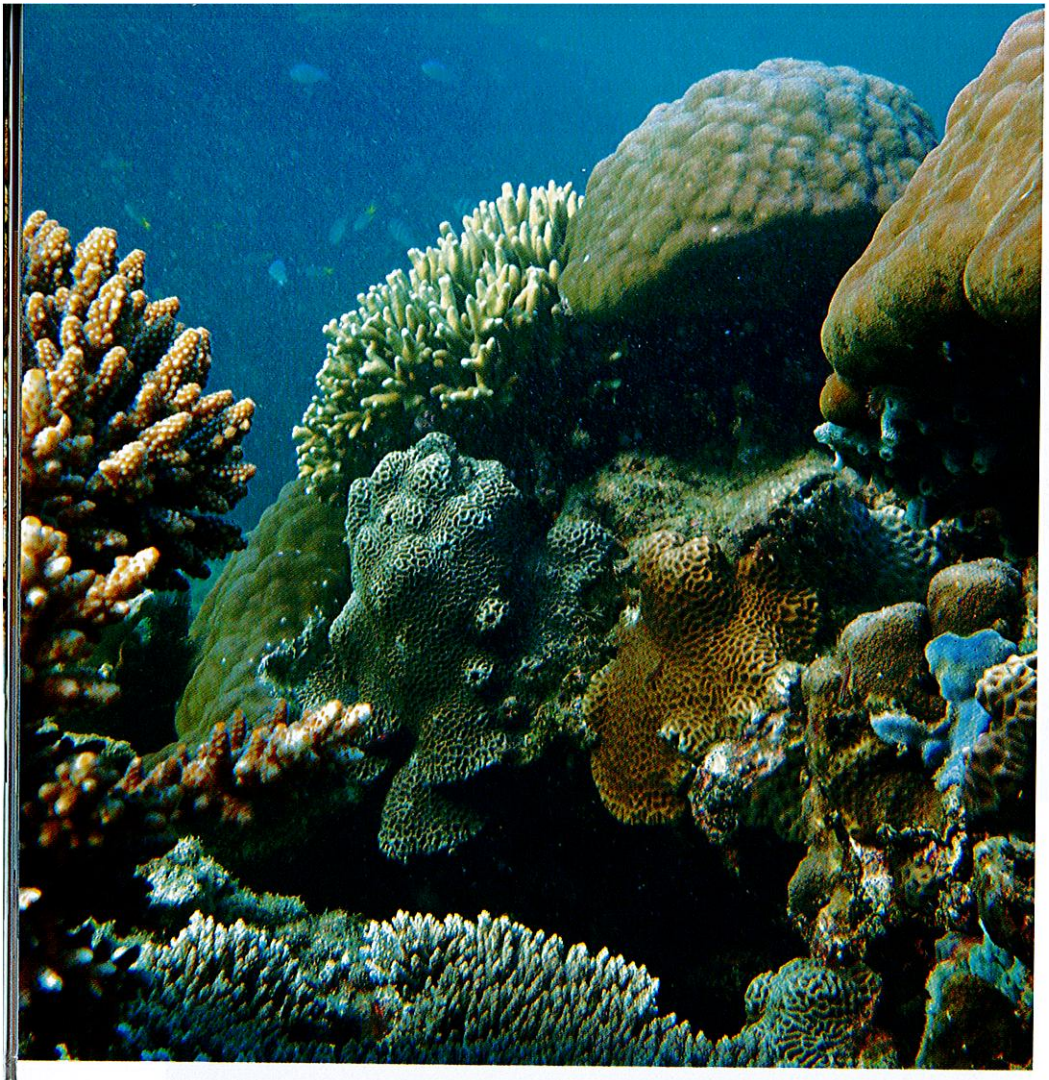
Mapping down under

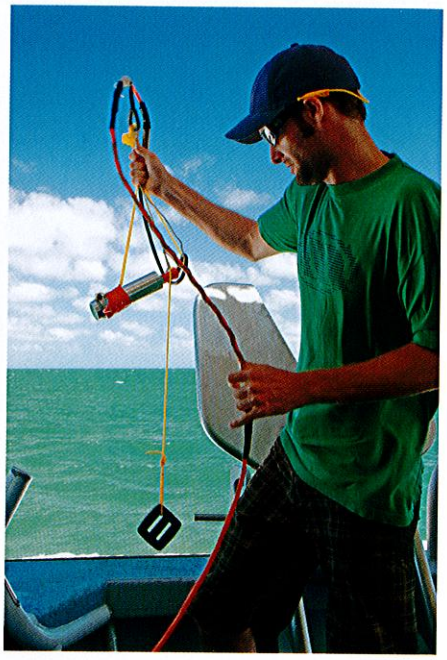
One of the most important tools used in planning marine parks and reserves is broadscale habitat mapping. Understanding where plants and animals exist is fundamental to planning for their conservation. Different suites of marine plants and animals usually exist at different depths, in different climates and regions, and vary in their tolerance to waves, wind and temperature. Information such as depth classes, bio-geomorphic units and broadscale habitat classifications therefore provide important clues about the biodiversity likely to be found in each particular area. When planning a system of marine parks and reserves, it is important to capture representative examples of these broadscale habitat classifications to ensure the plants and animals in a particular region are protected and managed.

Previous underwater surveys had been conducted in the Dampier Archipelago, in the Montebello and Barrow islands marine parks and reserves, and in many areas of interest to fisheries and industry development in the Pilbara region. However, other areas along the coast which have been identified as study areas were relatively unsurveyed and there was limited information on their marine habitats and species.

So, during October 2008, a DEC survey team—consisting of marine conservation planners Judy Zuideveld, Leanne Thompson and Aaron Davy, marine information officers Ray Lawrie, Chris Nutt and Ewan Buckley, and marine researcher Kevin Bancroft—undertook a marine benthic survey aboard the Department of Fisheries patrol vessel *PV Walcott* to rapidly classify habitats in key study areas throughout the region.

The first survey, lasting a week, started at the waters near the southern end of Eighty Mile Beach, south to the De Grey River mouth and the offshore waters surrounding Bedout, North Turtle and Little Turtle islands,





Above Fringing coral reef in the Mary Anne group.
Photo – Leanne Thompson/DEC

Above right Deploying the underwater video camera.
Photo – Judy Zuideveld/DEC

and finally between Cape Thouin and Ronsard Island, including the waters adjacent to Cowrie Beach.

The second survey took place over the following week in the waters surrounding the Great Sandy Island Nature Reserve, and Mary Anne and Mangrove islands between Onslow and Karratha. The areas were chosen because they had been highlighted as candidates for marine reservation (among other areas in the Pilbara region) and because limited information existed on their seafloor habitats.

Information gathering

To gather the greatest amount of information in the most efficient manner, the DEC officers collected habitat information using drop-down video cameras. This involved manoeuvering the boat until it was over one of the pre-selected sites and lowering a video camera—which was linked to a GPS unit—over the side of the vessel, while the skipper kept the boat in place.

Using this technique, the team recorded video footage of the seafloor at more than 900 sites. Information was collected on relief of the seafloor, seafloor type, and dominant organisms, species and communities. Based on this information, the DEC officers were then able to classify each site into broad habitat types including coral reefs, seaweed (macroalgae) or seagrass habitats, filter-feeding communities (sponge gardens), bare sand or mixed habitat types.

It soon became evident that the region had extensive marine diversity, with some small areas featuring an amazingly high coral cover of up to 80 per cent. Reef areas contained colourful reef fish—such as damsels, parrotfish and anemone fish—and other animals living on and around them. Larger fish, such as mackerel, trevally, coral trout and emperors, could regularly be spotted via the camera as they came to investigate whether the strange intruder to their world would be a tasty snack. The DEC officers were amazed at the way different marine communities mixed in some areas, with seagrass among sponges, among corals.

While the main focus of the trip was to obtain habitat information at the 900 field sites, the team often spotted larger marine wildlife while working. They saw humpback whales, many of them accompanied by recently born young, migrating southwards to their summer feeding grounds in the Antarctic. On one occasion, a large dugong suddenly appeared alongside the boat near False Island. Two team members also spotted what could have been an Indopacific humpback dolphin, an animal once thought to be widespread in Western Australian waters but now known to live only in small, scattered groups in defined home ranges along the Pilbara and Kimberley coast. Taxonomists are currently investigating whether humpback dolphins found in Australia are in fact a separate species to Indopacific humpback dolphins found elsewhere.

Sharks were relatively abundant during the survey. Team members were accompanied by white-tipped or black-tipped reef sharks on more than one occasion while surveying. Manta rays and devil rays were also occasionally seen, as was a shovelnosed ray. But the highlight was definitely the sighting of a three-metre-long tiger shark in 1.5 metres of muddy, murky water close inshore near the Robe River.

Above Underwater dunes near the De Grey River mouth.
Photo – David Bettini

Below background Terns are common birds on the Pilbara islands.
Photo – Leanne Thompson/DEC

Isolated islands

Despite it being very early in the turtle nesting season, many of the islands were criss-crossed with turtle tracks. Sea birds were also abundant, and Bedout Island in the north of the survey area is a seasonal home for nesting brown boobies and masked boobies. Majestic white-bellied sea-eagles were a spectacular sight, hovering with wings outstretched close to where the DEC officers were working.

In addition to the islands scattered across the area, another striking feature was the massive underwater dunefield at the mouth of the De Grey River, created by outflows during cyclonic events. As the boat was driving through this area the bathymetry would suddenly rise from 14 to two metres in the space of seconds. Despite being underwater, these dunes are so big that you can see them from space, and immense volumes of sand are moved around.

DEC officers found that the area was truly isolated at this time of the year. During the second trip they only spotted one vessel—a couple on a catamaran moving south.

The survey provided the DEC team not only the opportunity to gain fundamental information about the habitats of the area, but also to work alongside officers from the Department of Fisheries, who will one day assist with management of any marine parks and reserves that are created as a result of the planning process. The Fisheries staff—Andy Passmore, Mike Dunne, Terry Molloy, Craig Severin, Brad Tilly and Garry Johanssen—were passionate about the marine environment and were generous with their knowledge, providing valuable insight into many of the issues that need to be considered when planning for marine parks and reserves.

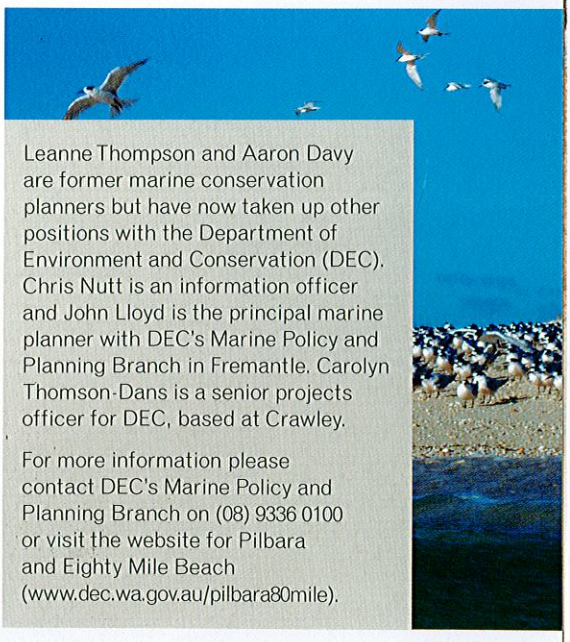
Filling in the gaps

Back in the office, the field information was entered into DEC's State-wide marine benthic habitat database, which includes more than 7,000 field sites in selected areas, mainly lying within marine parks and reserves. The additional 900 sites from the Pilbara survey will contribute significantly to filling the habitat data gaps in the north of the State.

DEC's Marine Policy and Planning Branch is working with the Information Services Branch to develop habitat maps for the study areas in the Pilbara, using the survey information analysed in conjunction with satellite image data. Sensors used to collect the images record changes in the amount of light reflected from the seafloor, which can indicate changes in habitat type.

The habitat maps, which will build a more comprehensive picture of the biodiversity patterns in these areas, will be used in systematic marine reserve planning across the Pilbara and lower west Kimberley.

Many parts of WA are fortunate in having relatively pristine waters, compared with other parts of the world. But, such is the interconnectedness of the ocean, we can't simply rely on this isolation to protect our waters and coasts. The ocean remains one of the last frontiers for scientists, and this is true of the Pilbara and lower west Kimberley coast. The areas surveyed revealed a wide range of habitats and marine wildlife and DEC is now better placed to recommend a network of parks and reserves for government consideration.



Leanne Thompson and Aaron Davy are former marine conservation planners but have now taken up other positions with the Department of Environment and Conservation (DEC). Chris Nutt is an information officer and John Lloyd is the principal marine planner with DEC's Marine Policy and Planning Branch in Fremantle. Carolyn Thomson-Dans is a senior projects officer for DEC, based at Crawley.

For more information please contact DEC's Marine Policy and Planning Branch on (08) 9336 0100 or visit the website for Pilbara and Eighty Mile Beach (www.dec.wa.gov.au/pilbara80mile).

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