
Capes coast beneath the

surface

A major benchmark study of the marine environment in the south-west 'Capes' region will give managers of a proposed marine park, encompassing waters from Busselton to Augusta, a head start in monitoring and managing this special and much-loved area.

by Carolyn Thomson-Dans and Mark Westera

The proposed 'Capes' marine park features several seascapes, each with its own special character. It is home to the wide, north-facing Geographe Bay, the exposed waters between Cape Naturaliste and Cape Leeuwin, the south-facing, crescent-shaped Flinders Bay and the wide lower basin of the Blackwood Estuary at Hardy Inlet. Every year, hundreds of thousands of locals and visitors enjoy or make use of the Capes' stunning marine environment.

The sheltered waters of Geographe Bay are popular with fishers, swimmers, snorkellers, scuba divers, windsurfers, sailors and water skiers. Busselton Jetty is the longest wooden jetty in the southern hemisphere, stretching almost two kilometres into Geographe Bay. Built over a 95-year period from 1865, it is used by fishers and divers alike. An underwater observatory at Busselton Jetty enables non-diving sightseers to view the spectacular marine life beneath the jetty. The reefs of the Capes coast provide spectacular snorkelling and diving opportunities. The HMAS *Swan* wreck provides an excellent dive site in Geographe Bay for those suitably qualified.

The large swells and excellent surf breaks along the Leeuwin-Naturaliste coast, such as those at Yallingup and Margaret River, provide some of the world's best surfing and excellent venues for national and international surf competitions.

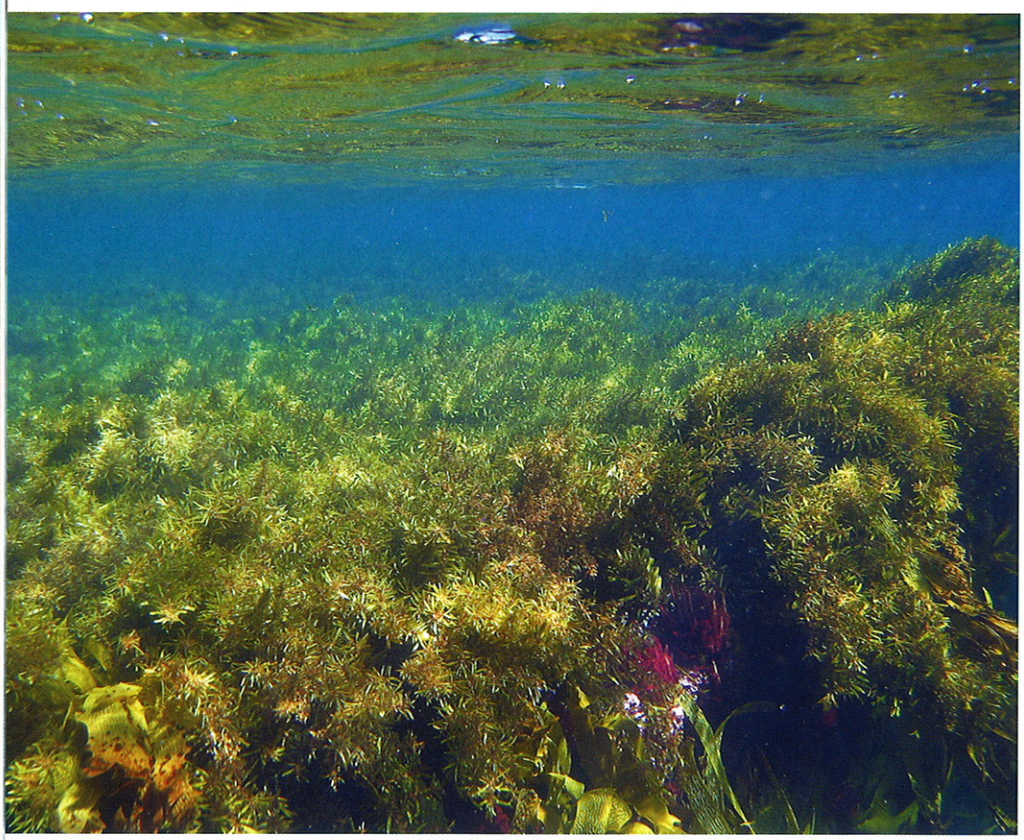
The beaches, rocky headlands and offshore waters provide a range of opportunities for recreational fishing. Dhufish, salmon, blue groper, snapper, tailor and skippy are popular targets for recreational fishers. Fishers also target western rock lobster and abalone. During autumn, schools of salmon migrate along Western Australia's southern coastline from the Great Australian Bight towards Cape Leeuwin. During this run, salmon often school inshore, moving along the beach and making them prime targets for recreational fishers. Hardy Inlet is also a favourite spot for recreational fishing.

Pressure on this unique area is set to increase dramatically, with a predicted doubling in the numbers of tourists and a 60 per cent increase in residential population by 2030.

Marine wildlife

The proposed Capes marine park's special character is derived from the fact that it lies at the southern end of the overlap between northern tropical species and the temperate plants and animals of the south.

At least 247 fish species have been recorded in the Bunbury–Geographe Bay area. The coastline between Busselton and Dunsborough provides important spawning and nursery habitat for at least 13 recreationally and commercially important fish, including Western Australian salmon (*Arripis trutta*), herring (*Arripis georgianus*) and King George whiting (*Sillaginodes punctatus*). The Hardy Inlet is used by both marine and estuarine fish, and is a nursery area for some species. The leafy seadragon (*Phycodurus eques*)—a protected species—lives in shallow reef and seagrass areas of southern WA, including Geographe Bay.



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Main Barnacle-covered reef.
Insets Sea star.

Above Western Australian nudibranch.

Left Seagrasses.
Photos – Mark Westera

Right A sea squirt.
Photo – Mark Westera

Areas with caves and overhangs support brightly coloured sea squirts, sponges, bryozoans or lace animals, and soft corals. Sea stars, sea urchins, crustaceans and shellfish are also found in this habitat. Many large fish, such as dhufish, western blue groper and harlequin fish, are associated with limestone and granite reef habitats.

The largest shoreline reef platforms are at Yallingup, Cowaramup, Gnarabup, and around Hamelin Island and the islands off Cosy Corner. They are home to a diverse range of invertebrates—such as turban shells, dogwhelks, abalone, sea urchins, anemones, sea stars, sponges, molluscs and crustaceans—and predators such as shorebirds and fish.

In winter and spring, watching humpback and southern right whales is very popular, particularly from Cape Leeuwin, Cape Naturaliste, Gracetown, Cowaramup and the Sugarloaf car park. Whale-watching charters operate from Flinders Bay and Geographe Bay. The peak southern migration of humpback whales in the area occurs during mid-October, and the peak northern migration occurs at the end of June. Blue whales—the largest living animals on Earth—frequent Geographe Bay and Flinders Bay, particularly during November. Geographe Bay is believed to be an important feeding area.

New Zealand fur seals only reappeared near Augusta during the past 20 years or so, after having been decimated by sealers last century. Numbers of fur seals—which haul out on Flinders, St Alouarn and Seal islands—are increasing, and breeding has been recorded on St Alouarn. A new colony recently began to inhabit a rocky island near Cape Naturaliste during the winter months.

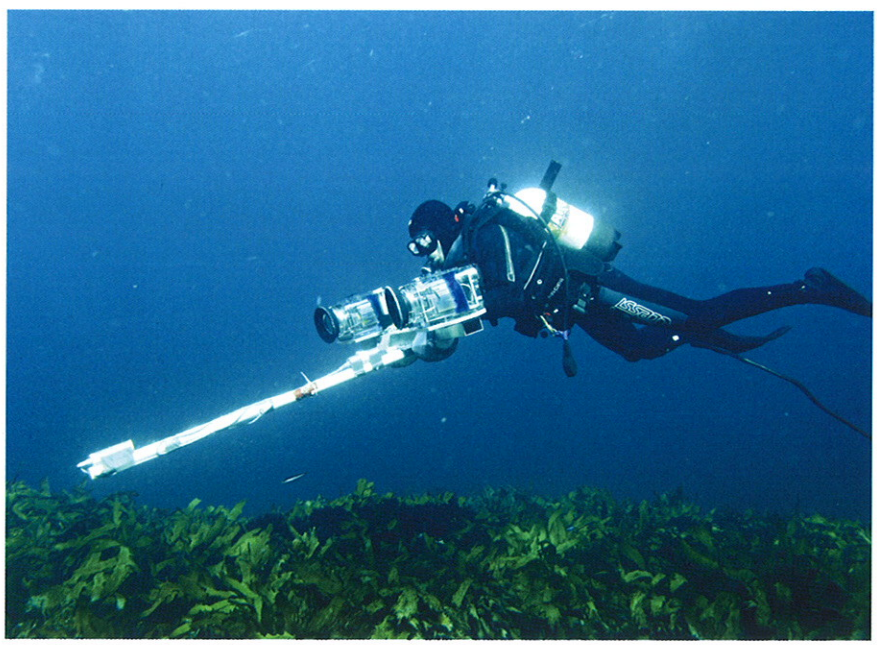
The biodiversity and beauty of the proposed Capes marine park is clearly worthy of protection and dedicated management. But if the area is to be well managed, scientists first need to determine exactly which marine plants and animals live in the proposed park now, what their natural levels of abundance and diversity were before human-induced changes over the past few decades, and what levels of change are occurring as a result of human impact such as nutrient-rich run-off from terrestrial development. This is where a major University of Western Australia (UWA) benchmark study, led by marine scientist Mark Westera, comes in. This research project is an initiative of the South West Catchments Council, funded by the Natural Heritage Trust, a joint program of the Australian and Western Australian governments.

Oral history

One important component of the study has been to conduct an oral history of the Capes region to document perceptions of how the marine environment might have changed in the past few decades. Interviews with many locals have unearthed a fascinating array of people and stories about fishing, crabbing, diving, boating, whale watching, water quality and other facets of the Capes marine and coastal environment.

The interviews indicated there had been substantial changes in the abundance and distribution of heavily targeted fish species. One fisherman has memories in relation to Flinders Bay in the 1940s:

> "I can remember in the old days people came in with their catch and they'd string them all up and they'd all stand in front of their catch and have their photos taken—huge catches of lots of dhufish, snapper and groper".



Several interviewees described an increase in sightings of whales in recent years, suggesting they are present in increasing numbers along the coast. Interviewees identified humpback, sperm, blue and killer whales as present in the region, with a 15-to-18-metre blue whale being reported in Flinders Bay.

Interviewees also described relevant changes to marine and estuarine environments in the region, including some specific observations of the impacts of land-source pollution and dams, and the declining health of a reef. Pollution from increasing tourism in the region was observed, but not linked with specific impacts, while changes in prevalence of some species were explained with reference to changes in ocean currents. On the positive side, most people believed there was now increased appreciation among fishers of all types and ages of the need for sustainable fishing practices, though views on the best way to manage fish resources differed. The oral history will be published in the near future and should make for fascinating reading.

Sanctuary zones

Marine parks in WA differ from our national parks in that people can still fish for native species (according to Fisheries Department regulations) in the majority of waters within most marine parks. Some areas, however, are set aside as sanctuary zones—look but don't take areas managed solely for nature conservation and low-impact recreation and tourism. Although these are generally relatively small in area, they sometimes result in criticism from some recreational fishers and from some conservation groups who say they aren't big enough. The indicative management plan for the proposed Capes marine park has proposed establishing 16 sanctuary zones which cover about 11 per cent of the park.

Top left Lush areas of kelp and other seaweeds in Hamelin Bay.

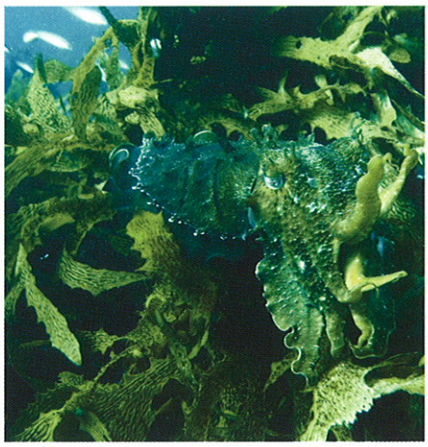
Centre left Marine scientists sample sponges.

Left A researcher records marine life with an underwater video.
Photos – Mark Westera and Euan Harvey

Right Eagle ray at Hamelin Bay.
Photo – Ann Storrie

Below right A cuttlefish hidden in the kelp.

Below far right Corals grow in the proposed south-west Capes marine park but do not form reefs.
Photos – Mark Westera



Mark Westera, Euan Harvey and Gary Kendrick are undertaking research that provides a benchmark of what is there now, which, over time, should be able to detect changes that occur as a result of sanctuary zones being established in the proposed marine park. He has established 22 study sites from Geographe Bay to Flinders Bay. These have been paired so that the sites inside the proposed sanctuary zones have been matched to comparable sites outside sanctuary zones.

Fish are being investigated using baited remote underwater video, a technique developed by researchers at UWA. Video cameras baited with pilchards are lowered to the seafloor to record the size and numbers of fish during set time intervals. Fish communities can be compared by repeating these video drops at different locations and different times. The researchers also take hand-held videos of fish and other marine animals as they swim along set transect lines.

By the time the park is declared, the study will have collected two years of data on the size and abundance of various fish, seaweed and invertebrate species in the Capes region including proposed sanctuary zones. The three-year study will hopefully be funded to continue into the future, enabling assessment of the potential impacts on the marine environment and the effects of sanctuary zones on biodiversity of marine animals and plants of the Capes region. The benchmark provided will include information on seaweeds, invertebrates and numbers and sizes of fish species which are commonly targeted by fishers—such as dhufish, western blue groper, breaksea cod and queen snapper—before and after the sanctuary zones are established.

Sanctuary zones will also allow researchers to compare populations of fish, seaweeds and invertebrates in these relatively undisturbed areas with those in areas that are potentially impacted by people.

Other marine life

Marine scientist Peter Barnes, an expert on invertebrates, particularly sponges, has so far documented 80 species of sponges, sea stars, urchins and other invertebrates in the proposed park. Of these, half are sponges and some are thought to be completely new to science.

The influence of the Leeuwin Current is very evident, particularly in Geographe Bay, where small patches of cabbage corals (*Turbinaria reniformis* and *T. mesenterina*) are quite common, despite being so far south.

Even the fish species have provided a few surprises, with a tropical fish species, gold-spotted sweetlip, being found to be quite common as far south as Injidup. The subtropical peacock wrasse and baldchin groper are also surprisingly evident in the proposed marine park.

At least 251 species of seaweeds have so far been identified by seaweed experts Julia Phillips and Gary Kendrick during the study. Thirteen of these species are believed to be 'range extensions' from further north and 14 species have only previously been found in more southerly locations.

Climate change may eventually lead to tropical species becoming even more evident further south, so the benchmark data that this study will provide is likely to become important in monitoring such changes.

Drain on seagrasses

A serious potential threat to marine life in Geographe Bay, in the northern part of the proposed marine park, are the nutrients from fertilisers and livestock droppings carried by run-off into waterways, such as rivers and

Above left Keen-eyed divers can sometimes spot leafy seadragons in Leeuwin-Naturaliste waters.

Above Yellowtail scad.
Photos – Ann Storrie

Below Seagrass meadow.
Photo – Mark Westera

drains, which empty into Geographe Bay and via groundwater into the surrounding marine environment.

In overabundance, nutrients such as nitrates and phosphates are detrimental to most plants and animals. Seaweeds respond rapidly to increased nutrient levels whereas seagrasses prefer low nutrient levels. Elevated nutrient levels increase the growth of small seaweed species that attach themselves to the stems and leaves of seagrasses, causing shading which inhibits photosynthesis. If this shading is prolonged it can eventually kill the seagrass.

Geographe Bay is dominated by three seagrass species: southern strapweed (*Posidonia australis*), sinuous strapweed (*P. sinuosa*) and southern wireweed (*Amphibolis antarctica*), which is most common in central parts of the bay. Between 1954 and 1976, seagrass cover declined at some locations in Geographe Bay, but is in overall good health.

The seagrass meadows of Geographe Bay form an important habitat for numerous fish and invertebrate species, utilise nutrients from terrestrial run-off and help stabilise sand throughout the bay, thus reducing erosion of the shoreline. A major study of the ecology of the bay's seagrasses has begun to help ensure they remain in good condition.

The study aims to set a benchmark of seagrass health and water quality for Geographe Bay so that any impacts of human population growth on seagrasses can be protected and minimised. Researchers will measure the number of seagrass shoots per area and assess the biomass or weight of seagrass per area of seabed, as well as algal communities growing on seagrass leaves.

Some of the techniques used to collect this information are quite innovative and sophisticated. For instance, artificial seagrass leaves made of strips of plastic are placed in seagrass beds. These are later removed and the attached algae are weighed and measured to assess their effect on live seagrasses. Seagrass tissue is also analysed to measure the levels of nitrogen and phosphorus in leaves. Scientists can even determine if they are terrestrially or naturally derived.

Given that one of the goals of marine park management is to increase understanding of fish diversity and to ensure that there is no loss of fish species over the long term, the research now under way is a gift to the future managers of the Capes marine park. No other marine park in WA has had the benefit of such 'before and after' research—targeted specifically at finding out the information that managers need to know—being done before the establishment of the marine park and so comprehensively. It should help to ensure that this marine environment, which holds such an important place in the hearts of Western Australians, will be well managed into the future.

Carolyn Thomson-Dans is Senior Communications Officer (Marine) for the Department of Environment and Conservation. She can be contacted on (08) 9336 0121 or by email (carolyn.thomson-dans@dec.wa.gov.au).

Mark Westera is a marine ecologist at The University of Western Australia, School of Plant Biology. He can be contacted by email (markw@cyllene.uwa.edu.au).

Important contributors to the study include participants in the oral survey, DEC, local councils, GeoCatch, Department of Water, Department of Fisheries staff in Busselton, Department of Agriculture and Food staff in Bunbury, the Busselton Underwater Observatory, CSIRO Marine Research, the Cape to Cape Catchment Group, South West Aboriginal Land and Sea Council, WWF, Cape Dive and the Dive Shed.

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Marketing Cathy Birch
Phone (08) 9334 0296 *Fax* (08) 9334 0432.

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