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A GUIDE TO CORAL COAST PARKS

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COAST OF CONTRASTS

The Coral Coast is an area of dramatically different landscapes, changing from spinifex and rocky gullies to seagrass and reefs within a distance of just a few kilometres.

This spectacular area includes Cape Range National Park on the western side of Cape Range Peninsula, Ningaloo Marine Park and the Jurabi and Bundegi Coastal Parks.

Hike through eucalypt woodlands or climb down deep rocky gorges and enjoy breathtaking scenery. Walk over flat spinifex plain and a succession of ancient coral reefs, climb coastal dunes down to sandy beaches and laze in the sun.

If you prefer fishing or snorkelling, dive into an emerald lagoon and swim over a coral reef, or take a boat through the reef passages, beyond the surf to the open ocean.

North West Cape, on the tip of the peninsula, is the nearest point in Australia to the edge of the continental shelf, which is one of the reasons for the abundant marine life in the surrounding waters.

The small resort of Coral Bay and the town of Exmouth are both great places from which to explore the Coral Coast Parks.

The Coral Coast is in the hot arid tropics of north-western Australia, where summer temperatures often reach 40 degrees Celcius. Tropical cyclones occur occasionally between November and April. Most visitors prefer the winter months when temperatures range from the low 20s to the low 30s.

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Browse CALM's Internet site at <http://www.calm.wa.gov.au>



DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

Things you need to know

WHERE IS IT?

The park stretches for about 260 km from Bundegi Reef in Exmouth Gulf, around North West Cape to Amherst Point south of Coral Bay.

WHAT TO DO

Camping, boating, coral viewing, diving, fishing (outside sanctuary areas), birdwatching, swimming.

VISITOR SERVICES AND FACILITIES

Concrete boat ramps at Exmouth, Bundegi and Tantabiddi Creek. Unsealed ramps for small vessels are also marked on the map on the back page. Small craft can be launched from most beaches.

Boat charters and other tours are conducted by commercial operators based at Exmouth and Coral Bay. Contact Exmouth Tourist Bureau for further details on (08) 9949 1176.

Diving is a great way to experience Ningaloo. Instruction, compressed air and equipment hire for snorkelling and scuba diving are available at Exmouth and Coral Bay.

Milyering Visitor Centre in Cape Range National Park is open daily - see opposite page.

CARING FOR NINGALOO

Living coral is delicate with only a thin veneer of tissue covering the hard skeleton. Once damaged, coral often takes many years to grow, so please drop anchors on sand away from coral and avoid standing on, or touching the tissue veneer.

Indiscriminate feeding can harm fish and damage sensitive corals. Artificial feeding may attract larger and more hazardous creatures. Please resist the temptation to feed fish and other shoreline fauna.

Check fishing regulations with Fisheries WA and please do not fish in the marine park's sanctuary zones. If cleaning your fish along the coast, please bury the offal at least 300 mm deep.

NEAREST CALM OFFICE

Exmouth District Office
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NINGALOO MARINE PARK

Ningaloo Marine Park protects one of Australia's most important tracts of reef. It is unique because of its proximity and accessibility to the coast, and for its prolific marine life.

It is the only place where the world's largest fish, the whale shark, can be predictably found and studied.

It supports more than 500 species of fish, 250 known species of corals and about 600 species of molluscs. Green turtles have extensive rookeries inside the reef, dugongs feed on seagrasses within the lagoons and humpback whales migrate close to the coast.

Ningaloo is an Aboriginal word meaning a promontory. Cape Range Peninsula is the promontory and Ningaloo Reef runs parallel to its western coast for approximately 260 kilometres.

It is part barrier, part fringing reef, with reefs ranging from seven kilometres to less than 200 metres offshore (a barrier reef is separated from the coast by a wide expanse of water, whereas a fringing reef is separated from the coast by a shallow lagoon).

Lagoons between the shore and the reef are protected from strong oceanic swells. Here, sandy bottoms are interspersed with seagrass meadows and hard corals such as staghorn corals (*Acropora* species), which dominate the shallows of Coral Bay.

In some areas, a very shallow reef, known as a beach platform, lies right on the shore.

Beyond the lagoon is a reef flat, or back reef, a zone that often stretches for several hundred metres out to sea. It is usually shallow and is washed by a strong

surge of water flowing from the surf that breaks on its outer edge. This water brings essential nutrients and oxygen to corals that make use of the abundant sunlight on the reef flat and within the lagoons.

Passages, or breaks, in the reef flat are similar to creeks flowing through Cape Range on the land.

Water flows through the channels with the changes in tide and the swells and allows these areas to support an enormous array of marine life.

The outer edge of the reef flat drops off to a rocky bottom, 10 to 25 metres deep. The drop is usually steep and has been weathered by constant swells that have formed caves, ledges and gullies along its length.

From the drop-off, the bottom slopes gently for up to 40 kilometres offshore, where it is 1,000 to 2,000 metres deep.

Ningaloo Reef occurs further south than would normally be expected for a tropical reef because of a southward-flowing stream of tropical water off the Western Australian coast.

This tropical stream was named the Leeuwin Current, after a Dutch vessel which explored the south-western coast of Australia in 1622. The current originates in the tropics and carries a variety of tropical marine species down the Western Australian coast.

Ningaloo reef has long been recognised as an important area

for tourism, fisheries and research in Western Australia. In 1987, Ningaloo Marine Park was proclaimed by both the State and Commonwealth governments and it is managed by the Department of Conservation and Land Management (CALM).

The marine park includes nearly all of the reef system and encompasses more than 5,000 square kilometres of ocean.

Ningaloo Marine Park is divided into management zones, reflecting the distribution of natural resources and separating activities that might conflict.

Sanctuary zones are "no take" areas where plants and animals must not be disturbed. They provide benchmark areas to compare with nearby exploited areas, and replenishment zones to restock these exploited areas.

Recreation zones are areas where recreational fishing is allowed, although commercial fishing is not permitted.

The general use zone makes up the remaining 60 per cent of the area and provides for commercial and recreational uses consistent with the conservation of natural resources.

Nearly 20 shipwrecks have been discovered in the park - the oldest were wrecked in 1811 and the most recent in 1931. Some, such as the Mildura, Fin and Perth, are visible from the shore or boat, and while closer inspection is welcome, the wrecks are protected under legislation.



coral spawning

Corals have developed several mechanisms for successful reproduction, including an excellent sense of timing.

The coral reef that stretches the length of Ningaloo Marine Park is made up of more than 250 species of coral. Each coral is made up of a colony of tiny polyps that are the living builders of the reef (coral reefs are the largest structures built by living animals).

Corals can reproduce both asexually, where polyps bud off from each other, or sexually, when the polyps release eggs and sperm, a process that ensures the genetic diversity of coral reefs is maintained.

Most corals release their eggs and sperm into the ocean and have evolved a synchronised mechanism to ensure fertilisation.

A dramatic mass coral spawning occurs on only a few nights of the year - generally about seven to 10 nights after the March or April full moons. Minor spawning also occurs after the full and new moons either side of the main spawning period. Just after dark, eggs and sperm are released into the water in such huge numbers that the water turns cloudy.

The incredible volume of spawn means there is a good chance of fertilisation occurring to form juvenile coral larvae, called planula, which later settle on the sea floor to form new coral colonies.

This mass spawning is a spectacular event at Ningaloo Marine Park, with many other invertebrates also reproducing at the same time. This results in a very rich collection of larvae in the plankton, which in turn attracts many plankton feeders, including the massive whale sharks.

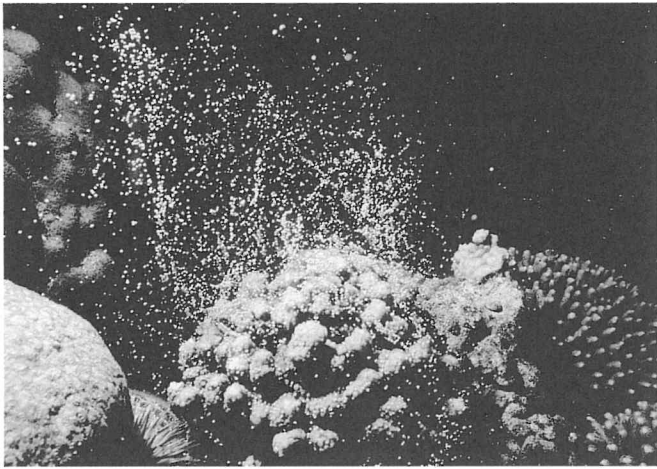
The tropical blue algae *Trichodesmium* can also occur in "slicks". *Trichodesmium* is sometimes referred to as "sea saw dust" and can be distinguished from the pink-red coral spawn slicks by its muddy-brown colour. *Trichodesmium* also has a pungent smell while coral spawn smells "fishy".

Observations of coral spawning in Western Australia have been carried out each year since 1984. Previous observation by visitors have provided a valuable insight into the geographical synchrony of coral spawning in Western Australia and the variability between years at the same locations.

CALM is keen to extend these observations as this information is important to the long-term management of the State's coral reefs. If you are observing the coral spawning, you can help by filling out and returning the Coral Spawning Recording Form available from CALM.

Left: coral spawn just after release

Previous page (cover):
Left: Mandu Mandu Gorge
Right: Marine life in 20-metre deep lagoon



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DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

CAPE RANGE NATIONAL PARK

Twenty million years ago, the north-west corner of Australia was covered by a warm, shallow sea. Later the crust of the earth crumpled and a huge anticline rose to form Cape Range Peninsula.

The backbone of the range is hard fossil-bearing limestones, laid down on what was once the sea-floor.

The rugged stone country of Cape Range descends to arid coastal plains and drifting sand dunes, then on to the turquoise waters of the coral reefs and ocean depths beyond Ningaloo Reef.

The Cape Range Peninsula has a number of sites containing evidence of earlier Aboriginal occupation. There are many shell middens in coastal dunes and there is evidence of occupation beneath rock overhangs and in caves in the foothills of the range.

While further work is still to be done, one of these sites dates back to more than 30,000 years. This is the oldest known site of an Aboriginal community based on a marine ecology in Australia.

Thomas Carter was one of the first Europeans to settle in the region when he took permanent residence at Point Cloates on the peninsula in 1889 and ran a pastoral station.

Cape Range National Park was declared a national park in 1964. Despite its arid climate, the area has high conservation value and is an important tourist resource because of its dramatic scenery and recreational opportunities.

The animals of the Cape Range Peninsula have adapted to the area's low and irregular rainfall and the limited fresh water supplies. Despite these harsh conditions, wildlife is abundant and includes red kangaroos, euros, rock wallabies, goannas and around 100 species of land birds.

Many of the plants and animals in the park are typical of the arid Pilbara region, but there are a number of unique features as

a result of the peninsula's relative isolation and geological history.

Some species, such as the desert pea, have distinctive forms, while others now isolated at Cape Range were once more widespread across northern Australia. About 10 species of plants are found only on this peninsula.

The low rainfall supports very few trees and shade is scarce, but the park does boast some salt-water forests - mangroves.

Mangrove forests (mangals) are a feature of the muddy northern Australian coast and there are extensive mangals in Exmouth Gulf on the eastern side of Cape Range Peninsula.

The western side, facing open ocean, is not as suitable for mangroves, but there are mangals at Mangrove Bay and in Yardie Creek. There are also scattered mangroves along the shore.

Mangrove Bay, which is flushed by a tidal channel, is the best developed example. A timber boardwalk and bird hide have been constructed for visitors.

Mangroves are flowering plants that grow in the intertidal zone, between high water and low water. There are 39 species of mangrove recorded in Australia, most of which grow in tropical northern regions.

Two species are common in Mangrove Bay: the white mangrove (*Avicennia marina*) which dominates the seaward margin, and the red mangrove (*Rhizophora stylosa*).

These two species show some of the unique adaptations that mangroves have evolved to cope with regular fluctuations in tidal level, saltwater and the oxygen-poor muds in which they grow.

Crabs are the most conspicuous and abundant of the marine invertebrate fauna at Mangrove Bay, with a total of 13 species recorded.

Mangroves are particularly important for birds in the arid and semi-arid regions of Australia, because they are often the only close canopy forests.



Termite mounds on a spinifex plain

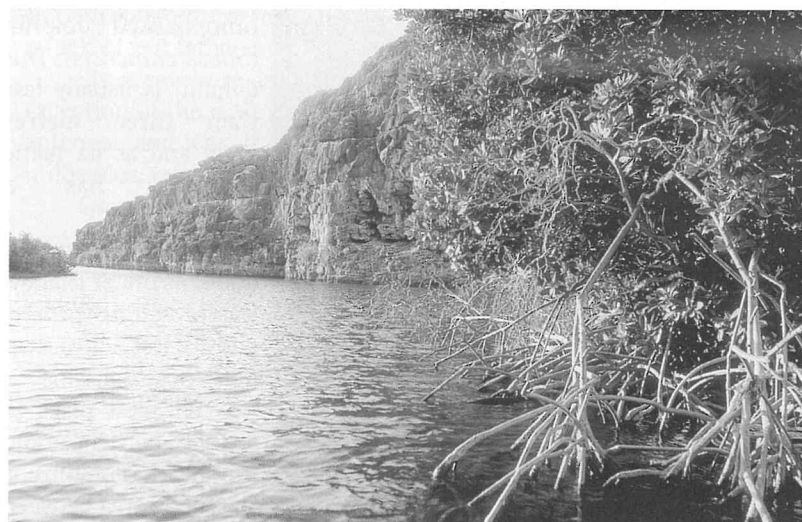
Mangroves and adjacent intertidal areas are also the favoured habitat of the venomous stonefish, so visitors should wear stout footwear in these areas. They are also high risk areas for contracting Ross River and Barmah River disease when mosquitos are swarming.

Prickly spinifex grass is one of the stark contrasts to the deep green of the mangroves on Cape Range Peninsula.

growing in the Pilbara - most take about three years to mature and flourish after rain.

Some species, such as *Triodia basedowii* form concentric rings. As the plant grows, the leaves in its heart die off, creating a hollow. In older plants, the centre dies completely, leaving a ring of live grass that continues to expand as the plant grows.

In the heat of the day, the outer leaves of the hummock



Mangroves on Yardie Creek

Most spinifex plants grow in a hummock shape, providing shelter for a variety of different animals.

There are at least seven species of *Triodia* or spinifex

reduce wind speed so that air in the centre is almost still. In this protected heart, evaporation and temperature are lower than outside and humidity is higher.

Dead leaves decay in the moist centre of the plant, attracting anything that feeds on rotting vegetable matter. A whole food chain of small creatures lives on this and ultimately supports larger predators.

Spinifex termites are the engineers of the termite mounds scattered across the hummock grasslands. Underground galleries fan out from the mounds, some up to 50 metres in length.

Given good rains, spinifex regrows quickly after fire, but it may do so at the expense of other more fire-sensitive plants, in some cases taking over almost completely from them.

Spinifex is otherwise quite fragile and is easily damaged - driving or walking over spinifex will kill the plants.

Please drive, walk and camp only on the hardened surfaces sign-posted for this purpose.



Charles Knife Canyon

Things you need to know

WHERE IS IT?

The northern boundary of the park is 39 km from Exmouth travelling north and around North West Cape. Exmouth is 1270 km north of Perth.

TRAVELLING TIMES

40 mins from Exmouth; three hours along the coast from Coral Bay; 14 to 15 hours from Perth. Visitors planning to drive to the Coral Coast should be careful after sunset when large numbers of kangaroos make driving hazardous.

WHAT TO DO

Walking, camping, canoeing, photography, nature observation, birdwatching, picnicking.

WALKS

Cape Range National Park offers a variety of trails both on the eastern and western sides of the range. They are classified according to their degree of difficulty and level of fitness required. A brochure containing details of the trails is available from the Exmouth CALM office and the Milyering Visitor Centre.

VISITOR SERVICES AND FACILITIES

Milyering Visitor Centre is open daily from 10am to 4pm. Displays, brochures and videos explain the natural communities of the Coral Coast, and a small library provides information for those with special interests. There is a public telephone in the vicinity of the Centre and light refreshments and souvenir items are available at the adjoining shop at most times.

Mangrove Bay bird hide overlooks a shallow lagoon. Shore birds roost in the lagoon at high tide and, during the summer months, migratory birds can be observed from the hide.

Some roads within the park are not sealed, but are accessible to ordinary cars. Four-wheel-drive is needed to cross Yardie Creek. Road conditions deteriorate quickly with rain and access to the park may become restricted.

Camp sites are signposted, but have limited facilities, with neither power nor water provided. Camping fees are charged and the maximum time that campers may stay in the park is 28 days. Visitors wishing to camp on pastoral land should contact the station manager.

Some water is available at one bore within the park, but visitors are advised to bring their own water supply. Hot, dry weather dehydrates your body quickly, so always carry plenty of water.

Park tours are conducted by commercial operators based at Exmouth and Coral Bay. Contact the Exmouth Tourist Bureau for details on (08) 9949 1176.

Walk trails, picnic facilities and toilets are available at many sites.

CARING FOR CAPE RANGE

Please note that dogs are not allowed in national parks, even when on a lead or in a vehicle. This is because the scent of a dog lingers and causes wildlife to vacate areas for many weeks. Dogs can also be a hazard around children or in groups of people near water or cliff tops. Dogs foul the ground where people walk, sit and picnic and people do let dogs loose when Rangers are not around, and other visitors complain. Poison baits are regularly laid throughout Cape Range National Park to control feral animals.

Recommended maximum driving speeds within the park are 80 km per hour during the day and 60 km per hour from dusk until dawn. Speeding vehicles pose a risk to emus and perenties during the day and to kangaroos from dusk to dawn.

Coastal dunes are easily damaged and once the vegetation has been removed the sand can erode quickly. Numerous tracks already provide access to the coast, so please remain on existing tracks.

No campfires are allowed in the park - please use personal gas barbecues and stoves.

It can be tempting to feed wild animals such as sea gulls, kangaroos and fish, but artificial feeding often leads to animals becoming ill and aggressive. Too much food will also encourage some species to the detriment of others, so please don't feed the wildlife.

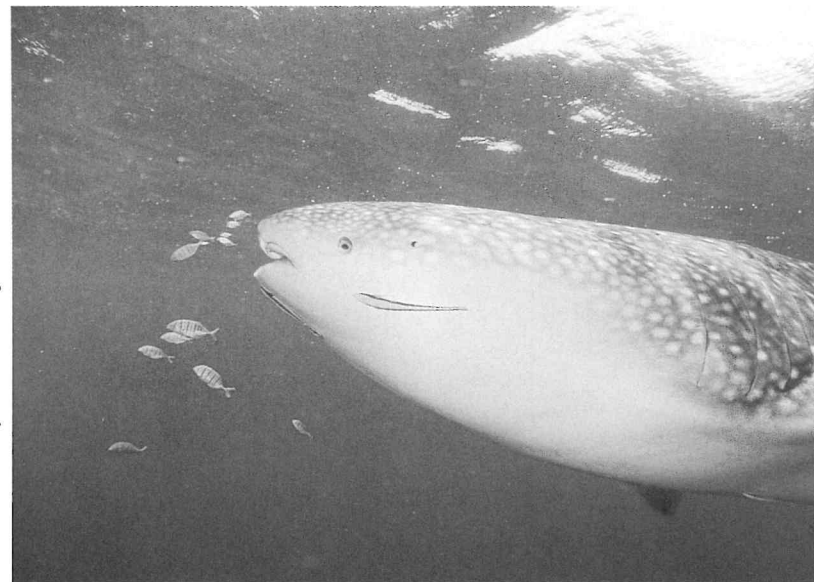
NEAREST CALM OFFICE

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Ph (08) 9949 1676

WHALE SHARKS

From mid-March to mid-May each year, following the mass spawning of coral, the world's biggest species of fish begins to appear in large numbers in Ningaloo Marine Park.

Many people regard the chance to dive with the animals as the experience of a lifetime, and visitors from all over the world converge on Exmouth during the whale shark season.



Whale shark with juvenile trevally

Whale sharks (*Rhincodon typus*) can grow up to 18 metres long, although the fish that come to Ningaloo are between four and 12 metres long. One 12-metre whale shark was weighed at 11 tonnes and its mouth was more than one metre wide.

They reach this massive size on a diet of plankton, occasional squid and small fish. Whale sharks have thousands of tiny teeth arranged in more than 300 rows, but they don't bite or chew their food. Water is drawn into their large mouths and strained through the gills, where a fine mesh of grill rakers extract the tiny plankton.

Whale sharks cruise the world's oceans in search of concentrations of plankton in a band around the equator.

Occurrences of the whale shark are patchy and unpredictable. Ningaloo Reef is one of only a few places in the world where they appear regularly in any numbers, in near-shore waters, easily accessible to observers.

Very little is known about whale shark numbers, behaviour patterns or how much human contact they will tolerate before becoming disturbed and perhaps avoiding any contact.

CALM has developed whale shark watching guidelines in consultation with charter operators, to try to keep interaction between people and fish to an acceptable level. For example, there are limits on the number of people who can swim with whale sharks at a time and how close they can get to the fish. There are also restrictions on how the charter vessels operate around whale sharks.

WHALES

There are 33 species of whales in the oceans around Australia and several of these migrate along the Western Australian coast.

The blue whale, the largest living animal on Earth, travels

through deep waters well offshore. Others, such as the humpback whale (*Megaptera novaeangliae*), swim closer to the coast and are frequently seen close to the outer reef at Ningaloo.

Each autumn, humpback whales leave their feeding grounds in Antarctica to migrate along Australia's eastern and western coasts to calve in northern waters, and then return to Antarctica in spring.

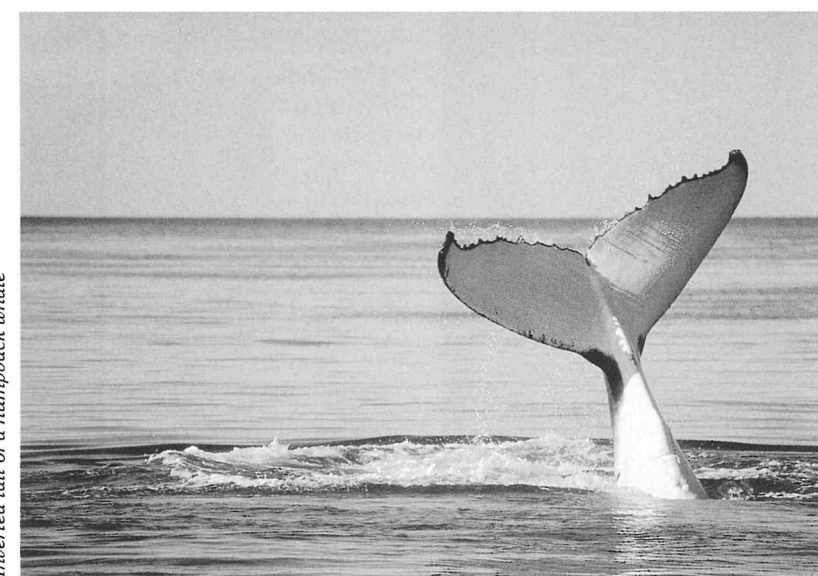
The best months of the year to see humpbacks in Ningaloo Marine Park are from August to October. Whale watching tours are organised from Coral Bay and Exmouth and are conducted according to a code of ethics



Bottlenose dolphin

drawn up by CALM. Swimming with whales is not permitted.

One of the more unusual sights that can be seen on a whale watching trip is a humpback whale standing on its head, with its tail sticking three or four metres into the air. The female whale may stay in this position for up to two hours - it is thought this is to discourage male suitors.



Inverted tail of a humpback whale

FAUNA

Like many whales, the females are larger than the males. Females grow to an average length of around 15 metres, whereas the males are about 14 metres.

DOLPHINS

Several species of dolphin can be seen around Ningaloo Marine Park, but the most common is the bottlenose dolphin (*Tursiops truncatus*).

This is also the species most included to interact with people - the famous Monkey Mia dolphins at Shark Bay are bottlenose dolphins.

One of the most distinctive features of the bottlenose dolphin is its clearly defined, relatively short, thick beak. The animals at Ningaloo average about three metres in length.

Bottlenose dolphins are very active. They will ride the bow waves of ships, surf ocean waves and coastal breakers and are capable of leaping up to six metres out of the water.

Another species frequently seen at Coral Bay and within the Ningaloo Reef is the Indo-Pacific humpbacked dolphin (*Sousa chinensis*). This dolphin is usually less than three metres long, and as its name suggests, has a humped back.

Humpbacked dolphins prefer shallow waters within the reef and are less active than bottlenose dolphins.

The best place to see both bottlenose and humpback dolphins is the sandy area between the shore and the reef between Coral Bay and

South Passage. Common dolphins (*Delphinus delphis*), which have a characteristic hourglass pattern of light grey and tan or yellow on their sides, may also be seen in this area.

Other species, including Risso's dolphins, spotted dolphins and common dolphins may be seen well offshore.

TURTLES

North West Cape and the adjacent islands are one of the world's main breeding areas for sea turtles.

Although turtles and turtle eggs are protected by law in Australia, most species are still endangered because of over-exploitation in other countries.



Green turtle

Four species of turtle nest in the North West Cape area:

- ❖ green turtles (*Chelonia mydas*) nest in large numbers each year;
- ❖ loggerhead turtles (*Caretta caretta*) frequently nest on the Muiron Islands, but are less common on mainland beaches;
- ❖ hawksbill turtle (*Eretmochelys imbricata*) nest infrequently in this area;
- ❖ flatback turtles (*Chelonia depressa*) nest in Australian waters only where it is protected.

The green turtle is the most common species and can be seen anywhere in the marine park.



Dugong

They are particularly active during the nesting season, an event that attracts many visitors every year. Nesting turtles come ashore at night between October and February, usually from one hour before high tide to two hours afterwards.

Females lumber up the beach leaving distinctive tracks in the sand. By quietly following these tracks, animals can be located in the sand dunes above high tide mark. Please don't shine lights on a turtle leaving the surf or moving up the beach.

When a turtle has dug her nest and begun laying, she can be approached quietly from behind

and can be observed with soft lights without undue disturbance.

Most hatchlings emerge from their nests from mid-January to late-April, between 5pm and 8pm, and rush straight to the water's edge. However, hatchlings are attracted to light and become confused if there are any lights near the beach.

Within Ningaloo Marine Park, large numbers of turtles nest towards the north of the Cape on the western side - Mauritius, Jacobsz and Jansz access roads are the closest nesting beaches to Exmouth and Vlaming Head.

For visitors camping in Cape Range National Park, the best beach to see turtles is at Turquoise Bay. However, far fewer turtles

come ashore here than at the northern beaches.

DUGONGS

Legend has it that the dugong - a Malay word that gives this species its scientific name *Dugong dugong* - was an enchantress that lured sailors and their ships into dangerous waters with their songs.

The animal that led to the mermaid myth looks more like a sea cow than a siren. Dugongs are similar in size and shape to a very fat dolphin, but are more closely related to the elephant, having evolved on land before moving into the

oceans to feed on seagrasses.

Over time, their grey-bronze bodies evolved into a dolphin-like shape, with a heavy and blunt head with the mouth opening downwards for convenient grazing. Dugongs have nostrils located on the top of the head that close by a valve-like mechanism, enabling the animal to breathe while most of its body is underwater.

Usually they spend only seconds on the surface between dives.

Dugongs digest seagrasses with the aid of bacteria in a large intestine that is as thick as a fire hose and is 30 metres long - a

bulky organ that explains the animal's portly appearance.

Dugongs are the only strictly herbivorous marine mammal and are widely spread in the waters of 43 western Pacific and Indian Ocean countries. Despite their range, they are rare in some areas and endangered in others.

EUROS

Euros (*Macropus robustus erubescens*), or common wallaroos, are frequently seen along the roads in Cape Range National Park and often take advantage of the shade at Milyering Visitors Centre.

Some visitors are tempted to give food or water to the euros at Milyering. Please resist this temptation, as it encourages the animals to expect food from people and the danger of a small child being injured in a dispute over food is dramatically increased.

Well-adapted to arid lands, euros can survive by drinking infrequently as long as they can

up to five metres in length and weigh 3,000 kilos.

Southern elephant seals live mainly in sub-Antarctic latitudes, but have been sighted in Ningaloo since at least 1983.

The seals can move surprisingly fast, so for your own safety you shouldn't go any closer than 10 metres while the animal is on shore and should not attempt to approach an elephant seal in the water.

SNAKES

Nine different species of sea-snakes are found in the waters off the Cape Range Peninsula.

Although most species of sea-snakes are potentially deadly, they are not normally aggressive, but they can be quite curious. They will sometimes swim up to a diver or swimmer in order to satisfy their curiosity and then swim away.

Should any snake show any aggression at all, get out of its way or out of the water.



West coast banded snake

shelter from the sun and feed on plants with high water content.

Their habitat usually includes steep escarpments, rocky hills or stony rises, and they like areas where caves and overhanging rocks and ledges provide shelter and shade. Kangaroos, on the other hand, prefer open plains. In the park, you may see red kangaroos on the coastal plains.

Mature male euros are typically twice the size of females and are usually darker.

There are a lot of myths about snakes in general, particularly sea-snakes. It is not true that sea-snakes have too small a mouth to bite people, or that sea-snakes have their fangs at the rear.

About 20 species of snakes are found on the peninsula itself, of which only four pose much of a risk to humans.

Four species of blind snake have been discovered on Cape Range Peninsula. These are much like an earthworm and totally harmless.

SOUTHERN ELEPHANT SEAL

Although only occasionally seen in Ningaloo Marine Park, southern elephant seals make a real impact: adult males can grow



Southern elephant seal

HOME IN THE RANGE



The limestone that forms Cape Range was laid down from marine sediments between 30 and 15 millions years ago, when the whole area was covered by a warm, shallow sea.

Over time, the seabed was thrust upwards as the Earth's surface faulted and folded.

During some periods, much higher rainfall occurred there than does now. The surface results of that rainwater are easy to see: Cape Range has been deeply eroded into weathered surfaces and steep gorges.

There have been equally dramatic changes beneath the surface.

Weathering and solution of the limestone have resulted in a massive system of more than 400 caves and other karst features which lie under the peninsula.

Deep caves can maintain a stable temperature and high humidity and can serve as refuges from changing climatic conditions. This means they may contain creatures that are not typical of the current climate. The caverns and underground waters of Cape Range have acted in exactly this way, providing refuge for an extraordinary collection of animals that is found nowhere else.

There are two main underground habitats on Cape Range Peninsula. The numerous caves within the range itself are often very humid, although few contain standing water, and the caverns and voids of the foothills and coastal plain contain fresh to saline water.

Animals fully adapted to living in caves and totally dependent on them for their survival are called troglobites. So far, 30 species of troglobite have been collected from Cape Range with only a small portion of the range and its caves searched.

The cave fauna has evolved from populations present in the area many millions of years ago.

Although the area is now arid, the caves harbour the sorts of animals you would expect to find in the leaf mulch of wet temperate and tropical forests of the eastern Australian seaboard today.

Since caves are dark, the more highly adapted cave dwellers may lack eyes, body pigments and, with the exception of the male genitalia, hardened body parts. Their non-optic senses tend to be well developed, and antennae and legs, if present, are elongated. They include spiders, micro-whipscorpions, pseudoscorpions, millipedes, woodlice, bugs, crickets and cockroaches.

Groundwater under the coastal plain supports a rich aquatic fauna, including two species of fish and several crustaceans (known collectively as stygobites). While the troglobites of Cape Range have relatives in other parts of Australia, the closest relatives of many of these stygobites are found in the Caribbean region and the Canary Islands.

This extraordinary distribution suggests that the stygobites are relicts from the Tethys Sea. This ancient sea formed with the break-up of the supercontinent Pangea, about 180 million years ago and persisted until about 40 million years ago. The north-west of the present continent of Australia formed part of its eastern shore.

Above: A blind shrimp from the Cape Range cave system

Dive into the pages of

The Marine Life of Ningaloo Marine Park and Coral Bay

This is a book for anyone wanting to learn more about Ningaloo's underwater world, or for visitors looking for a colourful reminder of their trip to the Coral Coast. Underwater photography and easy-to-read text lets you explore Ningaloo's abundant marine life, from the tiny Christmas tree worm to the world's biggest fish, the whale shark, whenever you like.

\$14.95

from the RAC, good bookshops, newsagents and CALM.

 DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT





AUSTRALIAN BUSTARD
(*Otis australis*)

Length: males 105-120 cm, females 75-85 cm. Top of head black; face and neck white faintly flecked with greyish brown; rest of upper parts mostly dark brown, finely marked with pale brown; wing coverts blotched blackish brown and white; narrow indistinct black band on breast; rest of underparts mostly white.



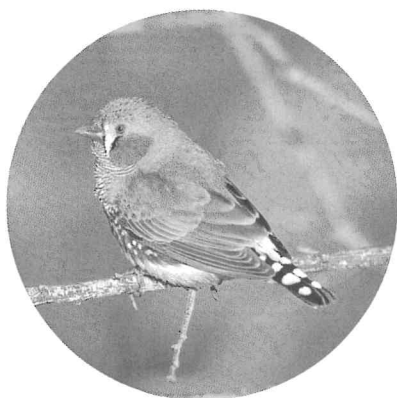
PIED BUTCHER BIRD
(*Cracticus nigrogularis*)

Length: 29-34 cm. Adults head and neck glossy black; broad white band between neck and back; back and scapulars black; rump grey to white; tail coverts white; tail black, all but central feathers tipped white; wing coverts mostly white; wing quills mostly black; throat and breast glossy black; rest of underparts white.



REEF HERON
(*Egretta sacra*)

Length: 60-70 cm. A robust heron with two colour phases - all white and mostly dark grey. White phase distinguishable from egrets by thick greenish legs. Grey phase distinguishable from white-faced heron by darker plumage, lack of white in face and greenish legs.



ZEBRA FINCH
(*Poephila guttata*)

Size: 10 cm. Grey body. Wax red bill; black and white tear stripes. White rump and zebra-barred tail conspicuous on fleeing. Male: chestnut ear patches, black chest bar; fine black and white barring on throat. Flanks chestnut, spotted white. White abdomen. Female: abdomen buff.



OSPREY
(*Pandian haliaetus*)

Length: 50-65 cm. A moderately large marine hawk with long narrow wings, strong feet and the suggestion of a crest. Head and neck white, streaked with blackish brown; blackish streak through eye and ear coverts to side of neck; back, wings and tail dark brown; underparts mostly white.

WESTERN SHIELD

The number of native mammal species found on Cape Range Peninsula has dropped from at least 38 at the time of European settlement in Australia, to just 17.

Two species lost from Cape Range are now totally extinct and two others are found only on offshore islands. Those that survive are not as abundant or as widespread as they were previously.

The main reason for this decline was the introduction of a new hunter: the European red fox.

CALM is working to prevent any further declines and to give native fauna a chance to recover their former abundance. This project, known as Western Shield, is believed to be the biggest nature conservation program of its kind.

Western Shield has several elements. Fox baiting is being carried out on a scale never before attempted (more than five million hectares have been targeted around the State, including Cape Range National Park) and research into feral cat control has been substantially increased. This is already resulting in the natural recovery of native animal populations and, as predators are controlled in target areas, species are being returned to former habitats.

CALM has also established a number of captive breeding programs, in collaboration with other agencies such as Perth Zoo and private wildlife carers, for animals whose numbers are extremely low in the wild.

Monitoring the impact of baiting shows that Western Australia's fauna emblem, the numbat, has been brought back from the brink of extinction.

Three other threatened species, the woylie, the quenda and the tammar wallaby, have increased in abundance to the point where they have been taken off State and Commonwealth lists of threatened animals.

This is the first time on mainland Australia that threatened lists have been amended because animals have increased in abundance as a result of a recovery plan.



Rock wallabies

a range of flora

Cape Range has a diverse flora, even though at first sight it may appear relatively uniform and sparse.

Shrublands of wattle and eucalypt or grasslands of heath and spinifex are reminders that this is indeed an arid area, with a long hot dry season, little water and no obvious signs of the massed spring wildflower displays seen on loamy soils to the south.

However, surveys record 630 species of flowering plants on the peninsula - an area of some 218,500 hectares. This is a surprisingly high number for an arid limestone area.

The Nullarbor Plain, by comparison, contains only 317 species of flowering plants in an area about 70 times the size (14.9 million hectares).

Environmental conditions on the peninsula are very different from the Nullarbor, because of the cooling effect of the surrounding sea and the sharp climate gradient across the range. The peninsula also has winter and summer rainfall, which gives the flora its special character. Many of the plants grow at their northern and southern range limits.

Several mangrove species found around North West Cape grow no further south, for example, and Ashby's banksia grows no further north than Cape Vlamingh. The other species at their range limits are 50 temperate plant species that occur in three areas on the peninsula: the red sandplains between the hills and on top of the Cape Range, the deep limestone valleys that cut across it, and the white coastal sands on its western side.

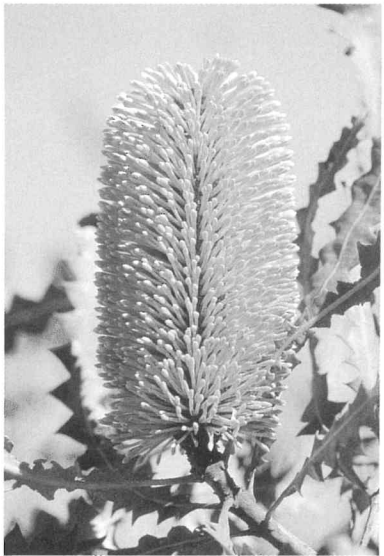
The vegetation of the Cape Range is dominated by eucalypts, which is unusual in the Carnarvon Basin, where acacias dominate nearly all of the vegetation types. One of these eucalypts, and at least 14 other species of flowering plants, grows only on the peninsula.

The flora is rich in the annual species and herbs that form the major components of all flora in arid areas of Western Australia. There are 21 species of mulla mullas, 51 species of daisies, 75 species of grasses and 47 species of peas.

The freshwater pools and gorges of the Yardie Creek system contain populations of leafy club-

rush, Indian sundew, cumbungi and Millstream palm, which are hundreds of kilometres away from their main distribution. The occurrence of the Millstream palm, for example, is the only one outside the Fortescue area of the Pilbara.

Finally, the seas around the peninsula are a mixing ground for temperate and tropical seagrasses, and a major area of species richness for these marine flowering plants in Western Australia.



Ashby's banksia



Sturt's desert pea

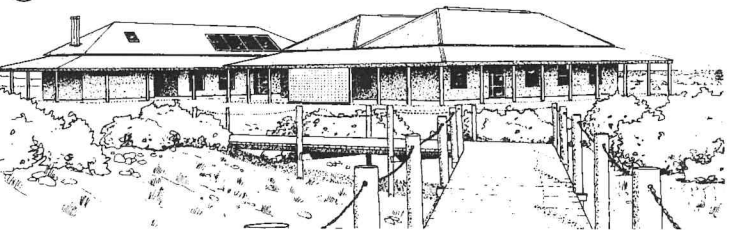
Milyering Visitor Centre, 52 kms from Exmouth in Cape Range National Park, is open most days. Contact the Exmouth Tourist Bureau or CALM office for opening times.

Built of locally-obtained rammed earth, powered by solar energy and serviced by self-mulching toilets, the centre is one of the most environmentally friendly structures in Australia.

Fascinating displays, brochures, videos and informative staff explain the natural communities and habitats of Cape Range and Ningaloo Reef. A small library is available to those with special interests.

Light refreshments and souvenirs are available from the adjoining shop at most times.

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT



MILYERING VISITOR CENTRE



WHITE-WINGED WREN
(*Malurus leuconotus*)

Size: 11.5-14.5 cm. Male breeding: distinctive bright to deep blue; wings white; tail deep blue. Male eclipse: like female; bill dark horn. Female: dull grey-brown above, whitish below; lacks red eye-ring. Voice: distinctive thin musical trilling.

AUSTRALIAN KESTREL
(*Falco cenchroides*)

Length: 30-35 cm. Male: grey head; pale rufous back and wings; whitish underparts with fine dark streaks; grey tail. Female (first year): head and tail pale rufous.

SPOTTED BOWERBIRD
(*Chlamydera maculata*)

Size: 25-31 cm. Brown to blackish-red above, head paler; body heavily spotted buff to rufous; pink nape crest; throat and breast finely spotted black.

MISTLETOEBIRD
(*Dicaeum hirundinaceum*)

Size: 10-11 cm. Male: head, upperparts glossy blue-black. Throat, breast, undertail coverts scarlet. Bill dark, short. Underparts grey-white; dark central streak on throat, breast. Female: brownish-grey above; undertail coverts pale scarlet. Voice high-pitched double note, also warble.

EMU
(*Dromaius novaehollandiae*)

Size: up to two metres tall. General body plumage dark brown to grey-brown. Plumage long, thick, drooping, soft and appears shaggy. Blue skin on head and throat. Long legs and dark grey-brown feet with three toes.

CAMPSITES

Mangrove Bay - day use only
No facilities. Bird and fauna hides nearby. Ningaloo Marine Park sanctuary zone.

Ned's Camp, 11 bays
Tables, toilets, good beaches for children, can launch small boat over beach, some shade and shelter.

Mesa Camp, 12 bays
Tables, toilets, good beaches for children, some shade and shelter.

North T-Bone, three bays
Table, toilet, good beaches for children, some shade and shelter.

South T-Bone, two bays
No facilities, no shade or shelter.

One Unit Bay, one bay
No facilities, no shade or shelter.

Lakeside, seven bays
Table, toilet, excellent beach, snorkel trail 400 metres to south, little shade or shelter, can launch small boat over beach. Occasionally floods on peak tides.

Camp 13, one bay
No facilities, little shade or shelter.

Camp 14, one bay
No facilities, little shade or shelter. Occasionally floods on peak tides.



Tulki, five bays
Table and toilet. No shade or shelter.

Turquoise Bay - day use only
Toilets, no shade or shelter, excellent beach for snorkelling and swimming, but be aware of strong current. Ningaloo Marine Park sanctuary zone.

Oyster Stacks - day use only
Excellent snorkelling, but be aware of the strong current. Ningaloo Marine Park sanctuary zone.

North Mandu Mandu, two bays
Table, little shade, no shelter, stoney beach, close to reef. Marine Park sanctuary zone.

South Mandu Mandu, four bays
Snorkel trail to the south, no facilities, no shade or shelter, good

beach to the south, close to reef. Ningaloo Marine Park sanctuary zone.

Bloodwood - day use only
Lookout over wildlife waterholes, excellent views of marine park lagoons and Cape Range.

Kurrajong, 10 bays
Toilets, protected location suitable for caravans and tents.

Pilgramunna, six bays
Toilet, no shade or shelter, occasionally floods on peak tides.

Sandy Bay - day use only
Shaded tables, toilet, excellent beach for children. Ningaloo Marine Park sanctuary zone. Beach fishing is permitted in this area.

AND DAY USE FACILITIES

Osprey Bay, 14 bays
Toilet, shaded table, no shade or shelter, small beach, good swimming but be aware of the strong current. Ningaloo Marine Park sanctuary zone. Beach fishing is permitted in this area. Excellent for viewing flora and fauna.

Bungarra Camp, five bays
Toilet, walking trail to beach, campsite set back one kilometre from the coast.

Yardie Creek Campsite, four bays
Low key camping - no caravans. No facilities, no shade or shelter. Toilet 200 metres away at day use area.

Yardie Creek Day Use Area - NO CAMPING
Tables, toilets, shaded picnic area, good beaches, boat tours from April to October.

One Kilometre Camp, six bays
One kilometre south of Yardie Creek. 4WD access only. Toilet, no shade or shelter, surfing.

Boat Harbour, four bays
5 km south of Yardie Creek, 4WD access only, no toilet.

A few points to remember to make your stay more pleasant:

- ❖ camp only in designated camp sites
- ❖ protect your wildlife - drive with care
- ❖ carry your own water supplies
- ❖ avoid driving over vegetation because it leads to erosion - stay on authorised roads and tracks
- ❖ no weapons are allowed
- ❖ do not bring animals into the park (1080 poison for fox control has been dispersed throughout the park)
- ❖ please dispose of litter in bins or take it away with you
- ❖ all fish offal to be buried at least 300 mm deep
- ❖ camping and entrance fees apply

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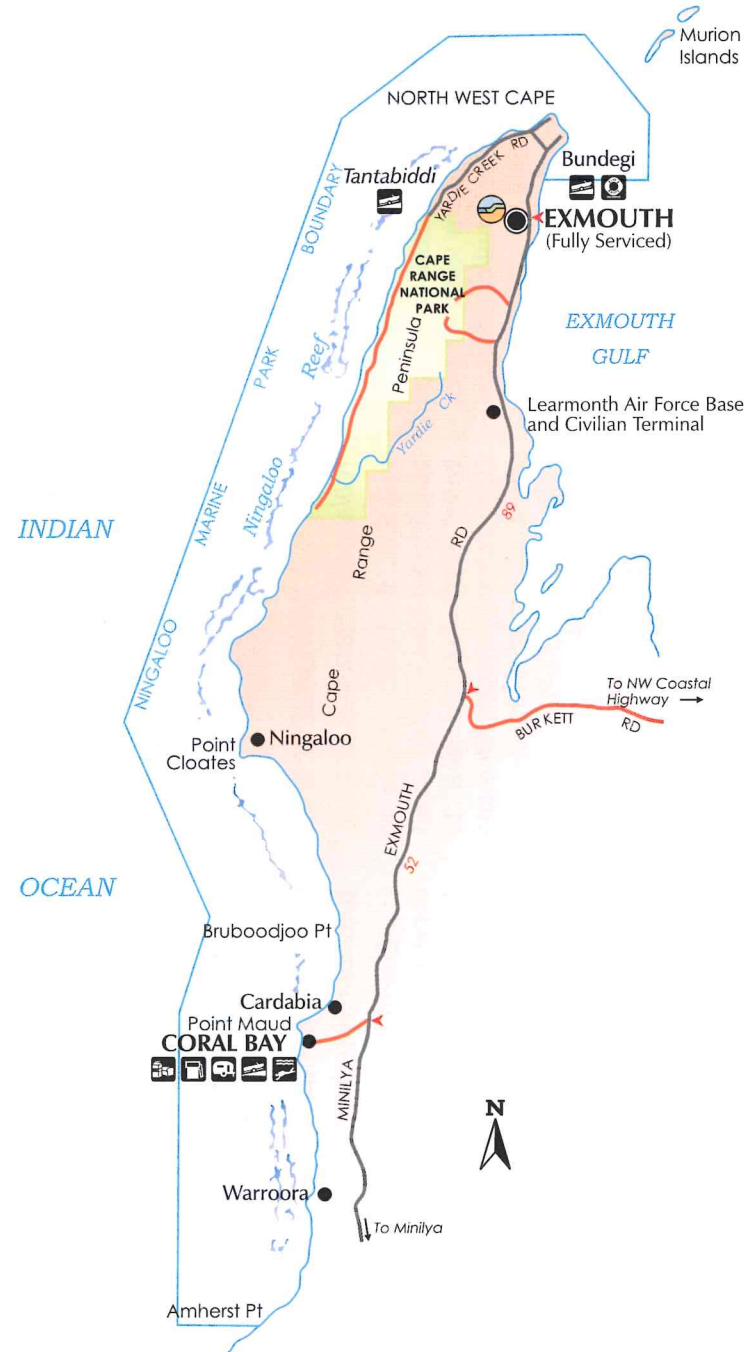
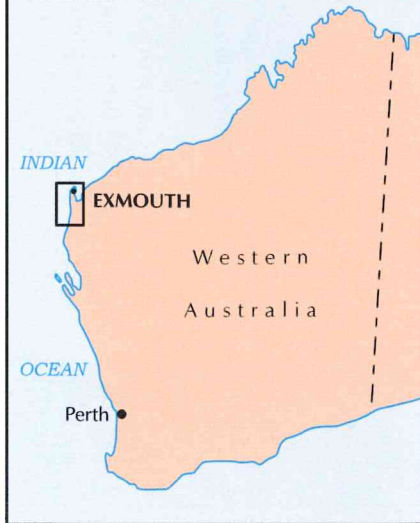
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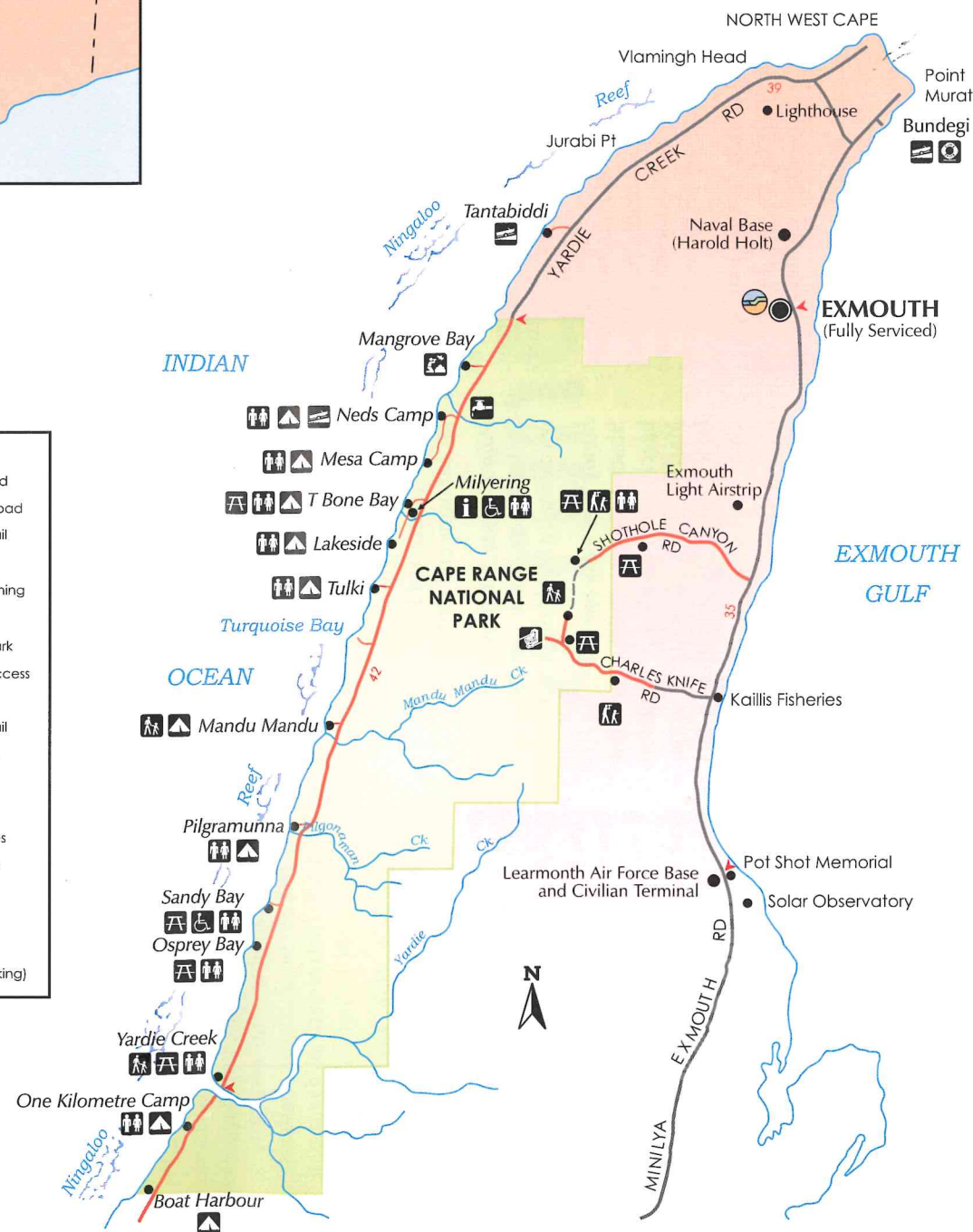
LOCALITY MAP



NINGALOO MARINE PARK

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kilometres

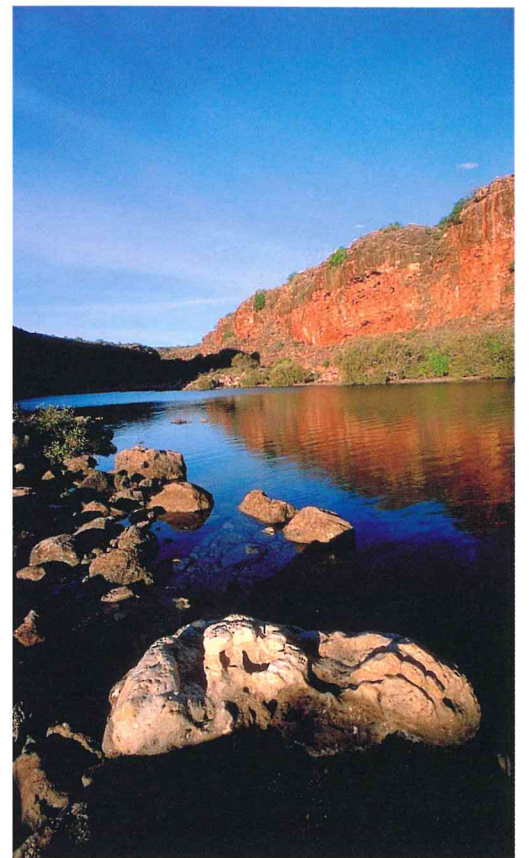
Key	
	Sealed Road
	Unsealed Road
	Heritage Trail
	Bird Hide
	Boat Launching
	Camping
	Caravan Park
	Disabled Access
	Diving
	Heritage Trail
	Information
	Lookout
	Petrol
	Picnic Tables
	Sea Rescue
	Supplies
	Toilets
	Walk Trail
	Water (drinking)



NORTH WEST CAPE

0 2 4 6 8 10 12
kilometres

Yardie Creek



Whale shark



Hairy dampiera



Aerial view of Ningaloo

