SHARK BAY

WORLD HERITAGE AREA

Department of Conservation and Land Management

World Heritage

A wide variety

Shark Bay's varied landscapes and habitats range from rugged sea cliffs along the coast to tranquil bays and inlets fringed by wide beaches of sand or shells. With a shoreline that meanders in a 'W' shape for 1,500 kilometres, the Shark Bay region covers about 22,000 square kilometres, roughly half of which is water. Facing the Indian Ocean are the spectacular Zuytdorp Cliffs, the elongated inlets and bays of the Edel Land Peninsula, and Dirk Hartog, Bernier and Dorre islands. Then there is the Bay, whose main bodies of water are 10-15 metres deep and divided by shallow banks and the many peninsulas and islands. Jutting into the Bay is Peron Peninsula, with its sandy, undulating plains punctuated by gypsum pans or birridas, with the fishing village of Denham and dolphins of Monkey Mia. This region's history, geology and natural features are so significant that Shark Bay has been internationally recognised as a World Heritage area, and it contains some outstanding national parks, marine parks and nature reserves managed by the Department of Conservation and Land Management.

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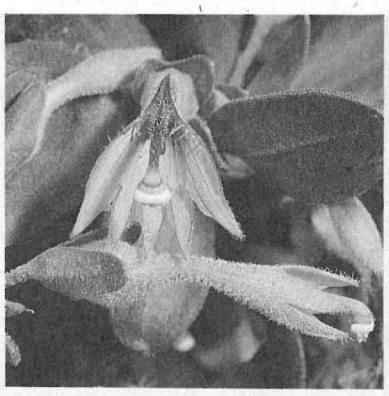
Photo: Zuytdorp Cliffs

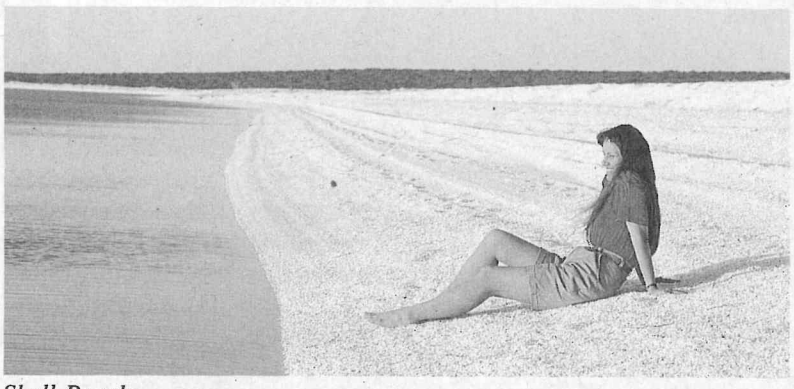


Felted fanflower

Shark Bay rose

The stromatolites at Hamelin Pool

World heritage listing



Shell Beach

Shark Bay became a World Heritage listed area in 1991 and is one of only a handful of places in the world that satisfy all four natural criteria for listing.

Other places include the Great Barrier Reef, Tasmanian Wilderness and the Wet Tropics of Queensland.

The first criterion for World Heritage listing is that the area should have outstanding examples representing the major stages of the Earth's evolutionary history. Shark Bay meets this with the Hamelin Pool stromatolites. The living microbes building these stromatolites are similar to those found in 3,500 million year old rocks which are the earliest record of life on Earth.

The second criterion is to have outstanding examples representing significant ongoing processes, biological evolution and man's interaction with his natural environment. Shark Bay's enormous seagrass beds are an impressive example of the role seagrasses play in modifying a whole marine ecosystem.

The seagrass directly influences the physics, chemistry, biology and geology of the Bay. For instance, seagrasses have created the Faure Sill, which has in turn created the hypersaline environment needed by the stromatolites of Hamelin Pool.

The region is also a meeting point of three climatic zones, and forms a transition zone between two major botanical provinces - the eucalypt-dominated South West and the acacia-dominated Eremaean.

In the marine environment, too, the area is on the northern extremity of many cold water species typical of the south and the southern extremity of many tropical northern species.

The third criterion is to have unique, rare or superlative natural phenomena, formations, or features of exceptional natural beauty.

Shark Bay has exceptional coastal scenery at the Zuytdorp Cliffs, Shell Beach and Cape Peron and unique natural phenomena such as the stromatolites and the Wooramel seagrass bank. To fully appreciate the beauty of the Bay it is recommended that visitors take a scenic flight over the area.

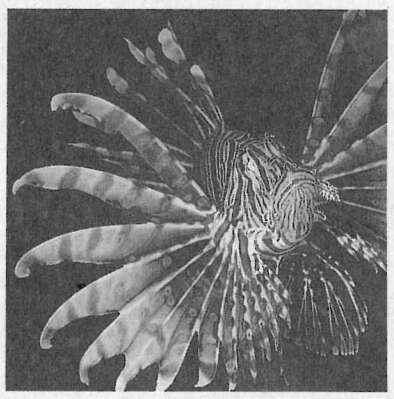
Shark Bay also meets the fourth criterion, by having significant natural habitats where threatened animal or plant species of outstanding universal value still survive.

The only natural wild populations of the banded hare-wallaby, western barred bandicoot and Shark Bay mouse are found on Bernier and Dorre Islands.

The Bay also has 13 threatened reptile species; three rare bird species, one tenth of the world's dugong population and significant loggerhead turtle rookeries.

It is an important site for migratory species such as the humpback whale and wading birds from Siberia and parts of Asia.

Rufous hare-wallaby



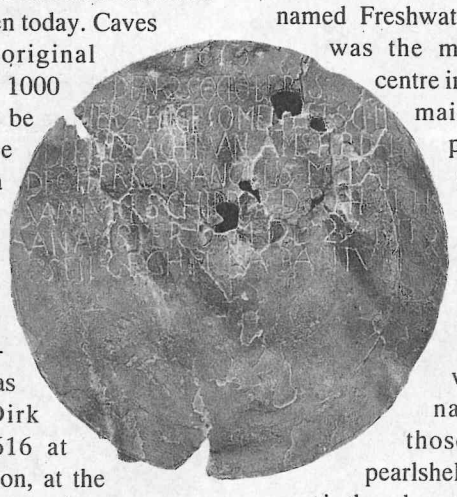
Lion fish

Pied cormorant

History

People have lived in Shark Bay for many thousands of years.

Long before European contact, Aboriginal people lived in the region and an archeological record of cave shelters and shell middens can still be seen today. Caves used by Aboriginal people about 1000 years ago can be seen on the Monkey Mia walktrail.



The first known landing of a European on Australian soil was made by Dirk Hartog in 1616 at Cape Inscription, at the northern end of Dirk Hartog Island. He erected a post to which he nailed a pewter plate from the ship's galley to record the visit.

Willem de Vlamingh revisited Hartog's landing site in 1697 when searching for survivors from a missing ship.

William Dampier, the first English visitor to Australia, landed in the same area in 1699. He spent seven days in Shark Bay examining the shore and his name of Shark's Bay remains today.

Following these explorers there were several French and English scientific expeditions to Shark Bay.

The first pastoralists arrived in the 1860s, about the same time as the pearl traders. The small pearls found at the Bay had an unusual lustre and the shell was in increasing demand for button-making.

By the early 1870s, small settlements were scattered along the shoreline and, as well as Europeans, pearling attracted many Malays, islanders and Chinese to the region. Denham was then named Freshwater Camp and was the main pearling centre in the area. The main street was paved with discarded pearlshell.

The stench from the 'pogey pots' on the beach was said to be nauseating in those days. The pearlshells were left to rot in these huge iron cauldrons and finally heated up so that the resulting stewy mess could be skimmed off, leaving the pearl content on the bottom.

After 70 years of trading, the Depression in the 1930s caused the pearling industry to close. In the past few years the pearling industry has undergone a minor revival, with the area being used to produce cultured seed pearls.

Fishing took over as the mainstay of the district and a cannery and processing works were established in 1912.

Today, Shark Bay thrives on tourism, fishing and wool. A solar salt project at Useless Loop has produced another viable commodity contributing to a growing export trade.

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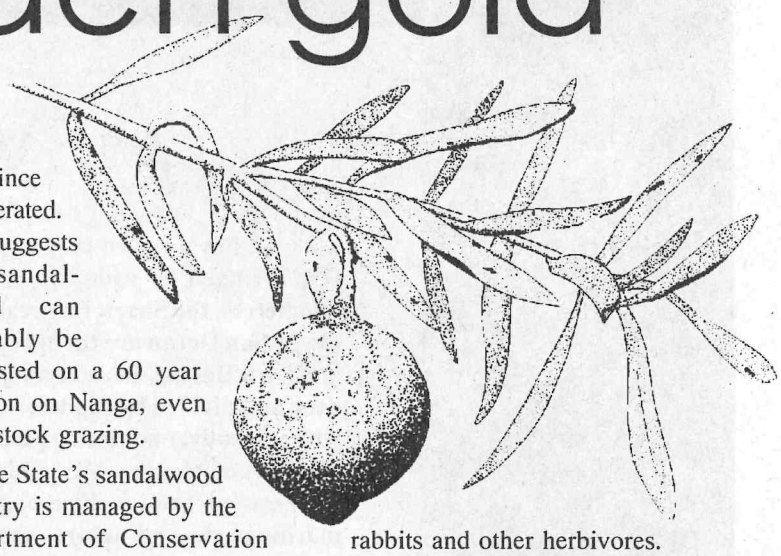
Wooden gold

Sandalwood has been exported from Shark Bay for 100 years.

The first shipments of the aromatic timber from Shark Bay left in the 1890s, bound for south-east Asia to be used to make joss sticks for religious ceremonies.

Shark Bay sandalwood differs from that growing in other parts of the State. Unlike other sandalwood, it's able to coppice, or send up new stems from a stump once the tree is cut down. The coppice shoots start producing seed again in three or four years, ensuring that harvesting can be sustained.

In fact, sandalwood harvesters working on Nanga Station are reworking old sandalwood tracks from the 1930s, using timber that has since regenerated. This suggests that sandalwood can probably be harvested on a 60 year rotation on Nanga, even with stock grazing.



The State's sandalwood industry is managed by the Department of Conservation and Land Management to ensure that timber is only harvested on a sustained yield basis.

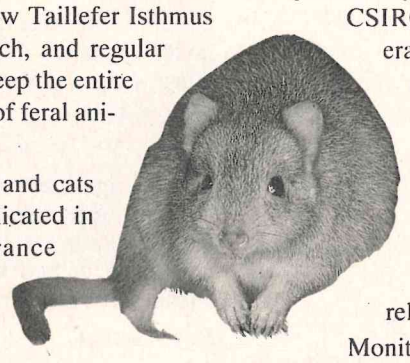
Its unpalatable leaves are another unusual characteristic of Shark Bay sandalwood - their bitter taste means they are avoided by domestic stock, rabbits and other herbivores.

It's not clearly understood what makes Shark Bay sandalwood so different. One theory is that the deeper red sand loams and more regular rainfall encourages a much bigger tap root system, which can support coppice growth.

Plan for Peron

Damaging feral animals may one day be removed from a 105,000 hectare area of the Shark Bay World Heritage area, making it a haven for rare native animals.

Peron Peninsula is now fenced off at the narrow Taillefer Isthmus near Shell Beach, and regular baiting could keep the entire Peninsula free of feral animals.



Feral foxes and cats have been implicated in the disappearance and decline of dozens of native animal species, and ten of these mammal species were once found on Peron.

They include animals such as the banded hare-wallaby, western barred bandicoot and the Shark Bay mouse which are now extinct on the Australian mainland and survive only on a few offshore islands.

Because of its size, the Peninsula could support large and stable populations of each of these species.

Peron and the Bay's other peninsulas have narrow necks that join them to the mainland, which means migration of feral animals could be easily controlled through fencing and baiting.

More research is still required on how cost-effective, long-term control of feral animals such as foxes and cats can be achieved. However, work to date in Shark Bay has provided encouraging results.

The Useless Loop Community Biosphere Project Group and the CSIRO appear to have eradicated feral foxes and controlled cats on the 8,500 hectare Heirisson Prong.

Burrowing bettongs (left) were recently released on the Prong. Monitoring over the next year will reveal whether the reintroduction has been a success.

Other feral animals that need attention are sheep and goats, which were rampant when the State bought the station in October 1990 to create the Francois Peron National Park.

Over the last three years, the Department of Conservation and Land Management has been eradicating sheep and goats from Peron Peninsula. More than 30,000 animals have been removed and it is estimated that only 2000-3000 goats remain.

A barrier fence at Taillefer Isthmus has successfully prevented any new animals from migrating onto the peninsula and it is hoped that a helicopter shooting program over the next two summers will reduce goat numbers even further.

The vegetation on Peron is regenerating well with the removal of this grazing pressure.

Research into fox and cat control will be conducted on Peron in 1994.

Each of these projects is an important incremental step in ridding Peron of feral animals and thus establishing a suitable habitat for native mammals.

CALM hopes that over the next decade feral control programs will be successful, and rare mammal reintroductions can begin. It will then not be too long before visitors to the World Heritage area will be able to see rare mammals.

This would be a popular attraction and provide a significant boost to the emerging ecotourism industry in Shark Bay.

Western barred bandicoot

4WD paradise

Shark Bay is a four-wheel-driver's paradise - with Steep Point and Francois Peron National Park two favourite destinations.

Superb fishing and sensational scenery are major drawcards, however, it is important to take care to do the right thing so that others can later enjoy the same areas. Off-road vehicles can loosen soil and destroy vegetation cover, increasing the risk of soil erosion.

To protect tracks, always reduce your tyre pressure to 110 kpa (16 psi) before entering them. Follow the signs and always stay on existing tracks. As soon as you leave main roads, vehicles should be put into four-wheel-drive. Using two-wheel-drive causes ruts and deterioration of tracks.

Steep Point, the westernmost point of Australia, is a popular fishing area. Steep Point is part of Carrarang Station and camping fees are payable. It can only be reached by four-wheel-drive through rough, arid station and salt-mining country. There is no firewood so it is best to bring your own. Here, you can see the magnificent Zuytdorp Cliffs, which rise to some 170 metres above sea level.

On Francois Peron, campsites at Big Lagoon, Bottle Bay and Gregories can only be reached by four-wheel-drive but low clearance vehicles are not suitable.

Limited firewood is supplied in the national park. Remember that collecting firewood causes degradation of vegetation and sand dune systems and removes animal habitats.

Peron Peninsula is interspersed with gypsum claypans known as birridas and vehicles have become hopelessly bogged in them. They are basically a thin surface crust over a bog mire, which is caused by groundwaters.

Vehicles can also damage the birrida's fragile vegetation, which is difficult to rehabilitate.

Drinking water is not available within Francois Peron National Park or at Steep Point, so visitors should always carry their own supplies.

Deflating your tyres is a must when four-wheel-driving through environmentally sensitive areas

Francois Peron National Park

Francois Peron National Park protects rare wildlife, spectacular coastal scenery and arid shrublands, and offers visitors a wilderness experience.

The park is named after the French naturalist who visited Shark Bay with the *Geographe* expedition in 1801 and 1803. In his journals Peron describes the wildlife he collected, the Aboriginal people he encountered and their dwellings.

Developed in the late 1880s, Peron Peninsula was managed as a sheep station until the State Government bought it in 1990. Today Peron homestead, easily reached by two-wheel-drive, offers visitors a taste of life during the pastoral era.

The area was also used by pearlers in the late 1800s and old pearl shells still litter the beach at Herald Bight, the site of a pearling camp.

The park is managed by the Department of Conservation and Land Management and covers about 40,000 hectares of undulating sandy plains interspersed by gypsum claypans known as birridas.

Most birridas were landlocked saline lakes when sea levels were much higher than at present, and gypsum was deposited on the lake floors. In some places the sea has invaded the claypans, such as at Big and Little Lagoons, to form shallow inland bays.

A variety of birds are found on Peron Peninsula, including fairy-wrens, scrubwrens, and wedgebills.

The endangered thick-billed grasswren was once widespread on the mainland, but is now restricted to a small area that includes Francois Peron National Park.

Thorny devils are abundant and feed on the ants that are common in the park. Euros and other small wallabies, small rodents and lizards also inhabit Peron Peninsula.

From the cliffs of Cape Peron visitors may see bottlenose dolphins playing, dugongs feeding, green and loggerhead turtles surfacing for air, and large manta rays gliding past just beneath the surface.

Above: Explorer Francois Peron
Below: Cape Peron

Bernier Island
Dorre Island
CARNARVON (fully serviced)
NORTH WEST COASTAL HIGHWAY
Shark Bay
Wooramel
Seagrass
Gudrun
Cape Peron North
Cape Inscription
Dirk Hartog Island
Bottle Bay
Gregories
South Gregories
Herald Bight
SHARK BAY MARINE PARK
Bank
FRANCOIS PERON NATIONAL PARK
Cape Lesueur
Quoin Head
Big Lagoon
Peron
MONKEY MIA
Wooramel Roadhouse
Faure Island
Little Lagoon
DENHAM (fully serviced)
Cape Bellelin
Cape Heirisson
Freycinet
Petit Point
Kopke Point
Lharidon Bight
Eagle Bluff
HAMELIN POOL MARINE NATURE RESERVE
South Passage
Steep Point
Useless Loop
Shell Beach
Reach
Nanga
DENHAM
Hamelin Pool
INDIAN OCEAN
Zuytdorp Point
Telegraph Station
Stromatolites
Hamelin
HAMELIN ROAD
Useless Loop
Henri Freycinet Harbour
Overlander Roadhouse
to Geraldton
Boundary 3 nautical miles off coast
Road
Zuytdorp Cliffs

KEY
- Sealed Road
- Unsealed Road
- 4WD Only
- Heritage Trail
- World Heritage Boundary

N

SHARK BAY WORLD HERITAGE AREA

0 10 20 30 40 50
Scale in kilometres

MONKEY MIA

Where is it?
23 km from Denham.

Travelling time
15 minutes from Denham.

Access
2WD.

What to do
Dolphin interaction, swimming, boating, sightseeing, photography, beachwalking, fishing.

Walk trails
Monkey Mia Walktrail - 3 km return

An easy one hour walk across the coastal dunes to the red sandhills and a lookout over the Bay, historic grave site, a bird hide, Aboriginal shelter cave and a quiet beach.

Beach walks

Skeletons of the sand dollar starfish are among the many interesting objects to be found on the beaches.

Facilities
Dolphin Information Centre, caravan park and resort, shop, restaurant, barbecue, toilet, boat ramp and jetty.

Fees
Are payable and will be collected at the entrance.

SHARK BAY MARINE PARK

Access
Boat ramp at Denham and Monkey Mia.

Things to do
Boating, diving, snorkelling, watching marine life, photography, fishing (outside sanctuary areas).

GUDRUN WRECK

Where is it?
5 nautical miles north of Cape Peron.

Access
Boat ramp at Denham or Monkey Mia or launch your boat from the beach of Francois Peron National Park.

Things to do
Boating, diving, snorkelling, watching marine life, photography.

PERON HOMESTEAD

Where is it?
10 km from Denham in the Francois Peron National Park.

Travelling time
15 minutes from Denham.

Access
2WD. Road condition is poor.

What to do
Sightseeing, photography, picnicking, walking or soaking in the historic hot artesian pool.

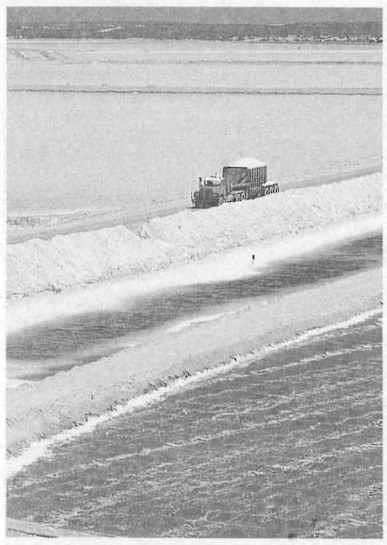
Walk trails
Pastoral lifestyle walktrail 45 minutes
Takes visitors through the homestead and outbuildings of the former pastoral station.

Facilities
Historic homestead, artesian pool, information panels, carpark, toilets.

Fees
Are payable and should be deposited at the box next to the gate by the homestead.

Osprey

Highlights of the World Heritage area



Useless Loop saltworks

GREGORIES/SOUTH GREGORIES

Where is it?
43 km from Denham in the Francois Peron National Park.

Travelling time
1 hour from Denham.

Access
4WD only (low clearance 4WD unsuitable).

What to do
Bush camping, four-wheel-driving, fishing, boating.

Facilities
Barbecue rings only.

Fees
Are payable and should be deposited in the box near the homestead.

CAPE PERON

Where is it?
57 km from Denham in the Francois Peron National Park.

Travelling time
1.5 hours from Denham.

Access
4WD only (low clearance 4WD unsuitable).

What to do
Sightseeing, photography, fishing.

Facilities
Barbecue rings only.

Fees
Are payable and should be deposited in the box near the homestead.

BOTTLE BAY

Where is it?
49 km from Denham.

Travelling time
1-1.5 hours.

Access
4WD only (not suitable for low clearance vehicles).

What to do?
Beach fishing, bush camping, sightseeing, four-wheel-driving, boating.

Facilities
Barbecue rings.

Fees
Are payable and should be deposited in the box near the homestead.

HERALD BIGHT

Where is it?
31 km from Denham in the Francois Peron National Park.

Travelling time
1 hour from Denham.

Access
4WD only (low clearance 4WD unsuitable).

What to do
Bush camping, four-wheel-driving, fishing, boating, beach walking.

Facilities
Barbecue rings.

Fees
Are payable and should be deposited in the box near the homestead.

BIG LAGOON

Where is it?
20 km from Denham in the Francois Peron National Park.

Travelling time
45 minutes from Denham.

Access
4WD only (low clearance 4WD unsuitable).

What to do
Four-wheel-driving, boating, fishing, bush camping, sightseeing.

Facilities
Barbecue rings only.

Fees
Are payable and should be deposited in the box near the homestead.

LITTLE LAGOON

Where is it?
5 km from Denham.

Travelling time
10 minutes from Denham.

What to do
Walking, bird watching, sightseeing, picnicking, beach fishing.

Walk trails
Lagoon Point Walktrail 1.5-2 hours
Meanders from Denham across shrublands to Little Lagoon. Beware of stonefish in the lagoon shallows.

Facilities
Gas barbecues, picnic shelter.

EAGLE BLUFF

Where is it?
24 km south-east of Denham.

Travelling time
20 minutes from Denham.

Access
2WD.

What to do
Sightseeing.

Facilities
Carpark.

SHELL BEACH

Where is it?
45 km south-east of Denham.

Travelling time
40 minutes from Denham.

What to do
Beachwalking, sightseeing.

Facilities
Lookout, information, carpark, toilet.

HAMELIN POOL MARINE NATURE RESERVE

Where is it?
105 km from Denham or 35 km from Overlander roadhouse.

Travelling time
1 hour from Denham or 30 minutes from Overlander roadhouse.

What to do
Stromatolite viewing.

Facilities
Historic site, information, tearooms/ shop, toilets, carpark, museum.

STEEP POINT

Where is it?
About 260 km from Denham via the Useless Loop Road.

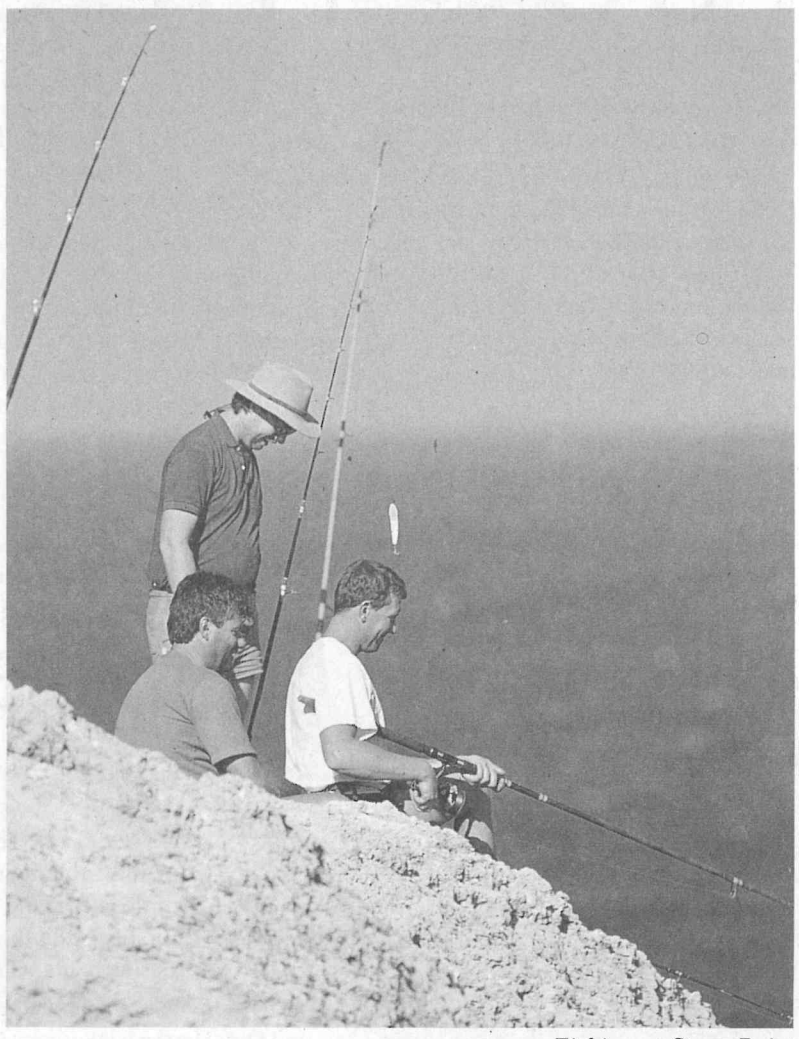
Travelling time
3-3.5 hours.

Access
4WD only.

What to do
Fishing, four-wheel-driving, bush camping.

Facilities
Ranger station, public phone.

Fees
Are payable and will be collected by the ranger employed by the station owners.



Fishing at Steep Point

Getting into hot water

People usually don't like getting into 'hot water'. But at Francois Peron National Park it's just the opposite - the famed 'hot tub' is one of the park's most popular features.

The hot artesian bore water was once essential to the survival of Peron Station.

Peron Peninsula lies within the Carnarvon Basin, a geological structure lacking permanent fresh surface water. In the late 1800s, when pastoral stations such as Peron were established, shallow beach wells were built to provide ground water of marginal quality for stock.

In the early 1900s, most of the wells became redundant as artesian bores were put down to provide a greater quantity and quality of water. More than 100 bores have been built for pastoral use in the Carnarvon Basin.

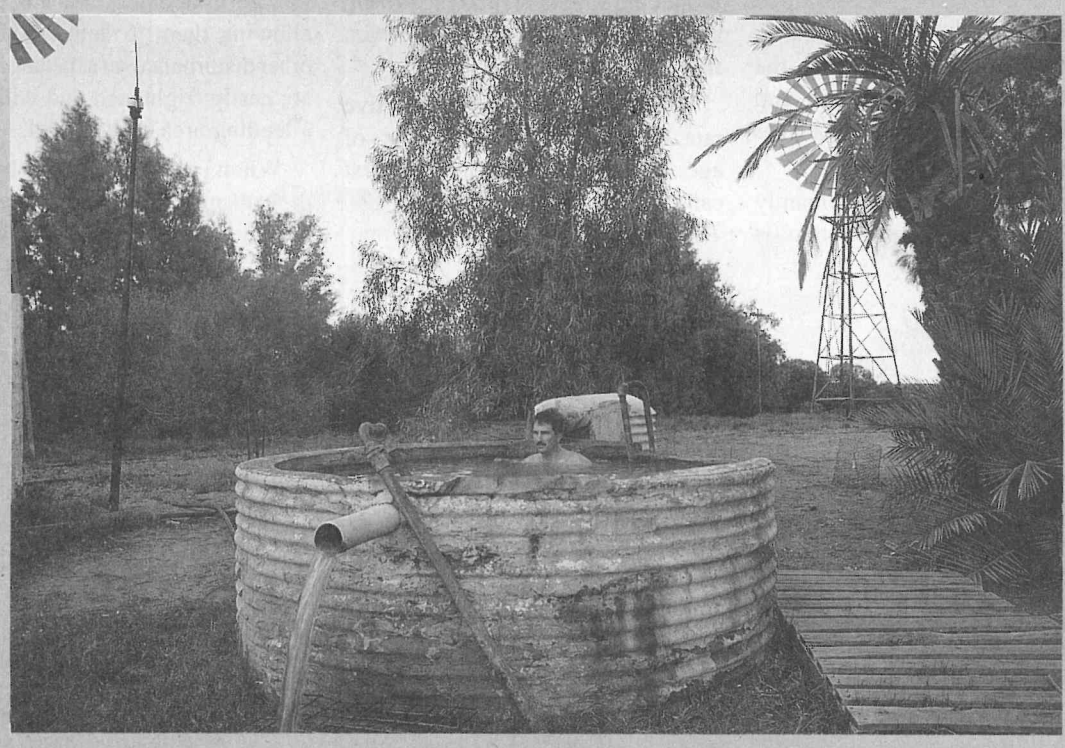
Artesian ground water exists, under pressure, in the sandstone below an impenetrable layer of shale. The pressure is created because the point where the coastal bore meets the artesian water is deeper than the source of the ground water further inland. When a bore is established, drilling continues until water is forced by pressure to the surface.

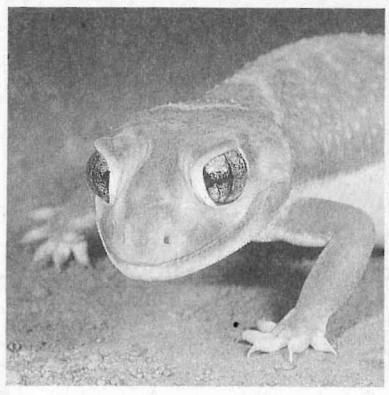
The old artesian bore at Peron was drilled between September 1922 and July 1923 to a depth of 542 metres. The 44-degree Celsius water flows at a rate of five litres per second, or 432,000 litres per day.

When Peron was run as a station, the water was pumped from the reservoir tank by three windmills to nine watering points located in five different directions.

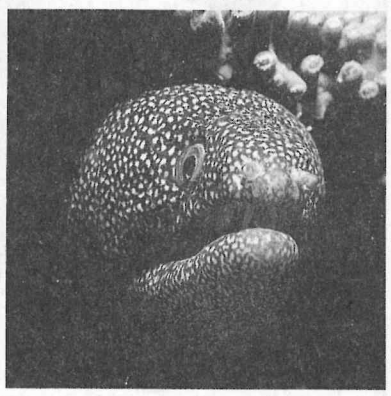
Elsewhere on the station, windmills were used to pump water 12 kilometres from the bore. The station's five artesian bores provided water for up to 17,000 sheep.

The unusual combination of artesian water and a reservoir tank at the Peron homestead is a unique cultural feature for the park and provides a glimpse of the pioneering history of the north.





Soft knob-tailed gecko



Spotted moray eel

Sea meadows

The largest seagrass bed in the world lies beneath the surface of Shark Bay.

The massive Wooramel seagrass meadow runs some 129 kilometres along the eastern shore of the Bay and covers 1030 square kilometres. Yet the Wooramel bank occupies only a quarter of the area of seagrass in Shark Bay. Other smaller beds make up the rest.

Seagrass differs from seaweed. Seaweeds are simple plants that have no roots or flowers and need a firm surface, like rock, to grow on.

Seagrasses, in contrast, are more closely related to land plants. They have adapted entirely to submerged living and produce underwater flowers. Pollination also occurs underwater and the currents convey the pollen from flower to flower.

Seagrass beds have significantly shaped the bottom of Shark Bay. By contributing to sediment build-up on the sea floor, seagrasses helped build the Faure Sill, which effectively isolates Hamelin Pool from oceanic circulation and thus enables the stromatolites to thrive.

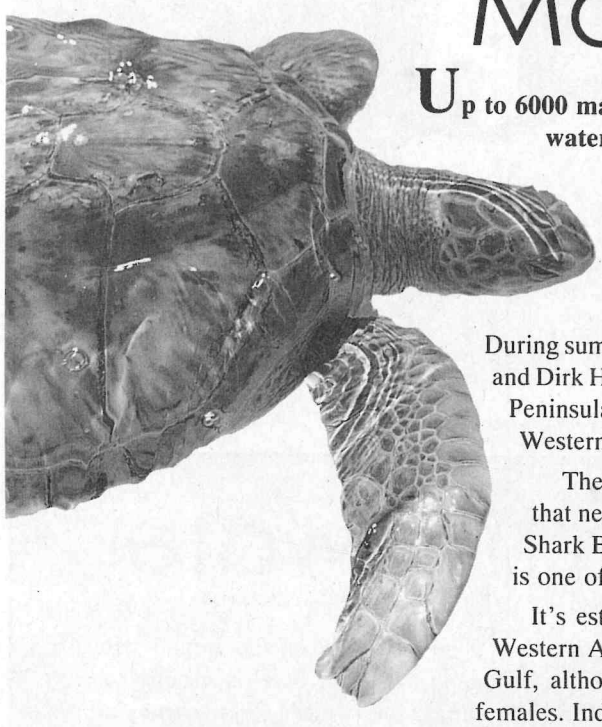
Well over 100 species of plants and animals grow directly on the Shark Bay seagrasses. Seagrass is a nursery habitat for the prawns, scallops and other fish that form the basis of an important commercial fishing industry in Shark Bay.

Other animals that are important in the food chain, such as the filter feeding oysters and scallops, feed on the bacteria and fungi of decomposed seagrasses.

Dugongs feed directly on wire weed and other seagrass species.

Shark Bay produces seagrass equivalent to four to six wheat crops a year from a similar area, an estimated eight million tonnes. This is more than enough to feed Shark Bay's resident population of about 10,000 dugongs.

Marine turtles



Up to 6000 marine turtles - most of them green turtles - live in the waters of Shark Bay.

They can be seen gathering in the Bay from the end of July, although the breeding season generally starts a little later in the year. After mating, the female lays her first eggs on the beach, repeating this on a fortnightly basis as many as eight times.

During summer, female green turtles lay their eggs on Bernier, Dorre and Dirk Hartog islands and occasionally at the northern tip of Peron Peninsula. This is the southern limit of green turtle nesting in Western Australia.

The loggerhead turtle, considered the most endangered turtle that nests in the Australian region, is also found in the waters of Shark Bay. Turtle Bay, on the northern tip of Dirk Hartog Island, is one of the few loggerhead nesting areas on the WA coast.

It's estimated that only 300 to 500 females nest each year in Western Australia, most of them between Shark Bay and Exmouth Gulf, although there could be three to four times as many adult females. Individual females don't nest every year, but 'skip' several years and may not return for seven years or more.

The Western Australian Marine Turtle Project, run by CALM scientists, was set up to find out more about marine turtles and their conservation needs.

Research to determine the significance of West Australian nesting sites to the survival of the endangered loggerhead species is a priority. Leaflets with information on how to identify species are available from CALM.

Gentle grazers of the bay

One of the largest and most secure populations of dugongs in the world forages in the shallow marine environment of Shark Bay.

In most places around the world, dugongs have nearly been hunted to extinction. It is estimated that around 10,000 dugongs, representing 10 per cent of the world's remaining dugong population, live in Shark Bay.

Protection of this population is therefore a high priority for the Department of Conservation and Land Management, which manages the Shark Bay Marine Park.

The animals feed predominantly on seagrass. The dugong's snout is expanded into a short trunk, with a greatly expanded upper lip equipped with complex muscles and bristles of varying size and stiffness.

They use this snout to root into the sea bottom and extract seagrass rhizomes.

Dugongs leave irregular feeding trails through beds of rhizome-producing seagrass species, stirring up mud clouds that are visible even from an aircraft.

They have a low reproductive rate. Females may live to 70 years of age, but don't produce their first calves until 12 to 17 years of age. The interval between births may vary between three and seven years.

Dugongs cannot haul out on land, and reportedly give birth in very shallow water. The single calf stays close to its mother for 18 months or more.

Although the calves begin to eat seagrass within two weeks of birth, females continue to suckle their young during their long association. Young dugongs often swim above their mother's back, presumably as protection against sharks.

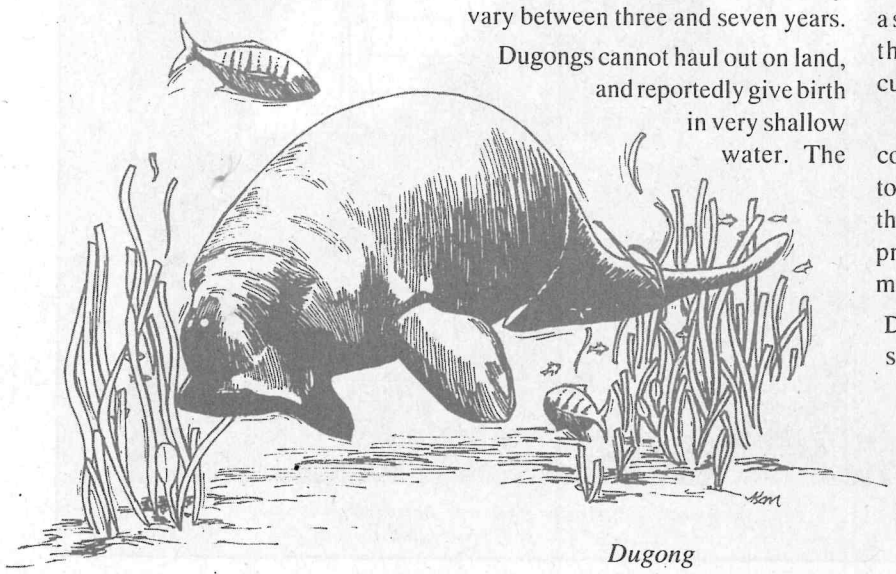
Their hearing is excellent, allowing them to detect boats and other disturbances at a distance. They are easily frightened and will leave a feeding area if disturbed.

When not frightened by fast movements or loud noises they may respond to the presence of a boat or a swimmer by coming to investigate, then disappearing when their curiosity is satisfied.

They should never be followed continuously, or forced to escape at top speed. Harassment could cause them to leave feeding areas, and prolonged high-speed swimming may cause damaging stress.

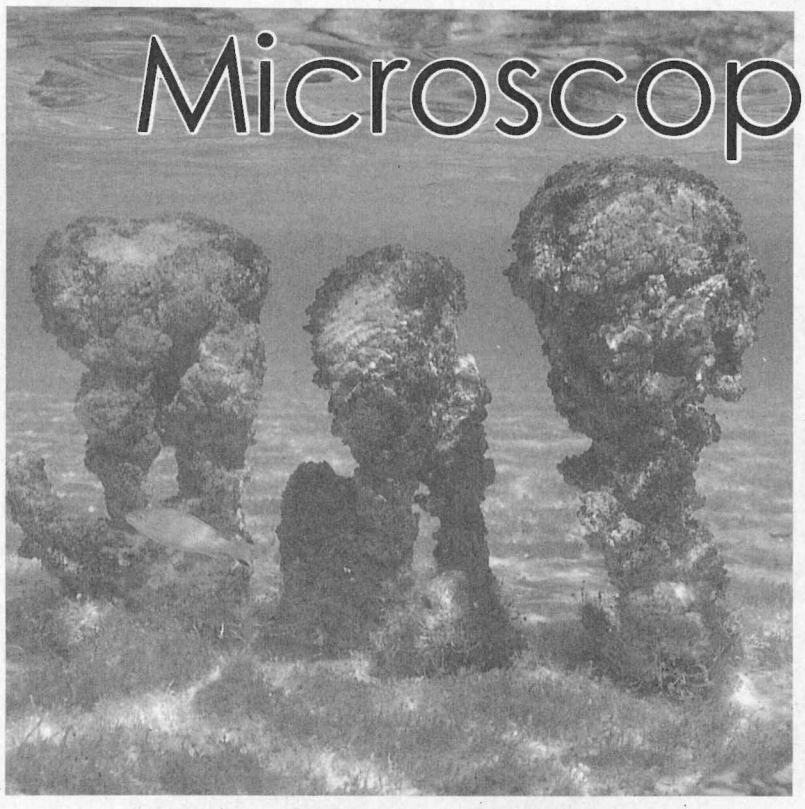
Dugongs inhabit the large shallow seagrass beds, so when boating travel slowly (about 10 knots) to avoid hitting or harming them.

If you come across a herd of dugongs, cut the boat's engines and drift and let them swim around the boat.



Dugong

Microscopic masterbuilders



People who first cast eyes on the rocky lumps strewn around the beach at Shark Bay's Hamelin Pool may well wonder what all the fuss is about.

But the lumps, or stromatolites, are actually built by living organisms too small for the human eye to see.

Within the structures are communities of diverse inhabitants with population densities of 3000 million individuals per square metre!

The stromatolite-building micro-organisms resemble the earliest forms of life on Earth.

The organisms use sediment and organic material to build stromatolites up to 1.5 metres high - up to 10 million times their size.

Their significance to science is inestimable

Because they grow very slowly, a metre-high stromatolite would be about 2000 years old.

When the Shark Bay stromatolites were discovered by scientists in 1956, they were the first growing examples ever recorded of structures, found fossilised in very old rocks, that had puzzled geologists for more than a century.

The discovery of modern examples has helped scientists understand the significance of micro-organisms in the environment and unravel the long history of life on Earth.

Similar organisms, for instance, helped form the rich iron-ore deposits of the Hamersley Range.

The same microbes that form stromatolites are dispersed through many shallow marine environments. However, bottom-dwelling communities dominated by microbes only become established in places where larger organisms are unable to survive.

Hamelin Pool's water is twice as saline as normal sea water and seagrasses and many other forms of life cannot survive there.

Their significance to science is inestimable; however, they are very fragile and can be degraded by visitors walking over the site to view them.

Historic

The visitor site is adjacent to the historic Hamelin Pool telegraph station and is the only place where the public can view stromatolites in Shark Bay.

As a result, a new boardwalk will be built by the Department of Conservation and Land Management at Hamelin Pool. The boardwalk will include information boards and will enhance public appreciation of the sites as well as protecting the stromatolites.

BHP Engineering helped CALM with the design, so the boardwalk would not cause significant long-term impacts on the fragile stromatolites.

Monkey Mia dolphins

Wild dolphins have been swimming in to the beach at Monkey Mia to interact with people since the early 1960s.

Dolphin curiosity has sparked human curiosity and people from around the world now come to Monkey Mia to see the bottlenose dolphins.

About 20 dolphins have been known to come to the jetty at various times and seven or eight are now regulars - two of them are third generation visitors.

The dolphins swim to shore regularly and allow themselves to be stroked, usually arriving in the morning and then swimming in and out for the rest of the day.

The dolphins are fed only small amounts of fish and at irregular times, so they don't become dependent on the handouts.

Locals say the association between people and dolphins at Monkey Mia began when 'Old Charley' was handfed from the side of a fishing boat. He took the fish gracefully and continued to come back over following days.

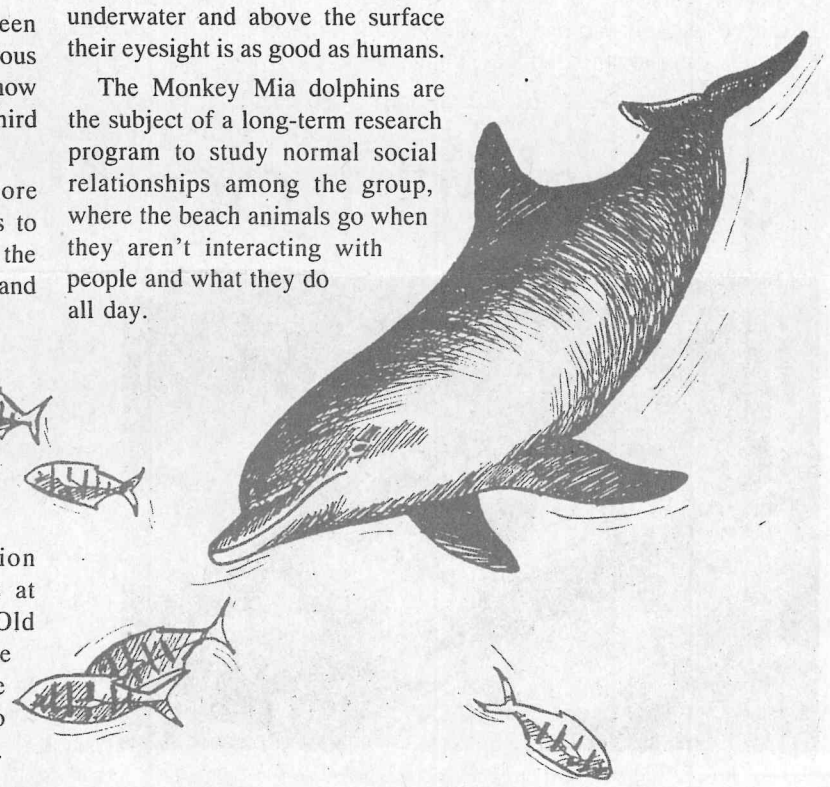
Bottlenose dolphins are highly social mammals. They are sometimes found roaming as solitary individuals, but more often live in pods ranging in size from two to 20.

Members of a pod help each other in activities such as fish herding and calf rearing. They use their biological sonar to locate objects underwater and above the surface their eyesight is as good as humans.

The Monkey Mia dolphins are the subject of a long-term research program to study normal social relationships among the group, where the beach animals go when they aren't interacting with people and what they do all day.

Rangers are on duty every day at Monkey Mia to help and advise visitors and ensure that the dolphins are well treated.

There's also a Dolphin Information Centre, which along with the reserve, is jointly managed by the Shire of Shark Bay and CALM.

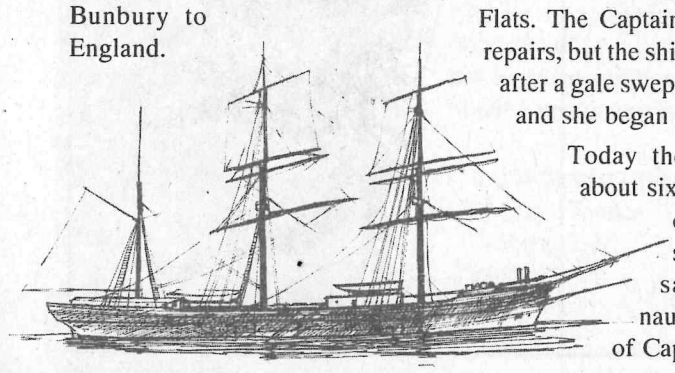


Gudrun finds a sanctuary

Mystery and sabotage lie behind the tale of the *Gudrun*, the biggest wooden shipwreck found off Western Australia.

Mystery because no-one knew of the wreck's location until 1989, when Paul Anderson, a Canadian studying dugongs in Shark Bay, found her on the sand flats north of Cape Peron in the Francois Peron National Park.

The *Gudrun* sank in 1901, carrying a load of jarrah from Bunbury to England.



She was sabotaged by the ship's carpenter, who admitted drilling an inch and a half hole through her bottom.

Though repaired in Fremantle after the hole was discovered, the *Gudrun* sprang a leak about four days out of Fremantle and was forced north by strong winds.

By the time she reached Shark Bay, she had four feet of water in her hold, and the vessel was deliberately scuttled in the shallow sandy Peron Flats. The Captain hoped to make repairs, but the ship was abandoned after a gale swept through the Bay and she began to break up.

Today the wreck lies in about six metres of water on the southern side of the fourth sandbank, 5.3 nautical miles north of Cape Peron.

It is within the Shark Bay Marine Park, managed by the Department of Conservation and Land Management, and a special sanctuary zone extends 500 metres around the wreck to protect the site. Artefacts can't be removed from the wreck and line fishing and spearfishing are not permitted.

The wreck's superstructure has been flattened by the constant flow of the current and the occasional cyclone, and while her hull is buried largely intact up to a metre in the soft sands, iron frames and fittings rise above the sea bed.

The *Gudrun* has become home to a rich variety of fish and marine life, including marine turtles, giant groper, stingrays, spotted cod, many species of trevally and sweetlips. As a result, it is a spectacular area for recreational divers.

Fabulous flora

Shark Bay's flora is varied and beautiful - but you have to look.

At first glance, the area's flora seems to be low, wind-pruned and relatively uniform. Visitors may be surprised to learn that Shark Bay is a region of major botanical significance.

Shark Bay is in fact the meeting point of two botanical 'provinces': the flora of the south-west and the desert meet at the base of Peron Peninsula and Edel Land, and change abruptly.

Here, it is possible to stand in a tree heath surrounded by south-western banksias, grevilleas, melaleucas and eucalypts, and see the start of the desert's spinifex plains.

The Shark Bay region has about 700 species of flowering plants. This alone is a high figure for an arid region, but of these species a staggering 146 (more than 24 per cent) are at the northern limits of their ranges.

These include such well-known flowers as the State emblem (the red and green kangaroo paw), three species of coneflowers (*Conostylis*), a smokebush, two orchids (the rattlebeak and bunny orchid), woollybush and running postman.

About 30 species of flowering plants are confined to the Shark Bay mainland and offshore islands.

Some of the more spectacular are a one-sided bottlebrush (*Calothamnus formosus*), a subspecies of limestone melaleuca (*Melaleuca cardiophylla* spp.*princeps*), a lamarchea (*Lamarchea hakeifolia* var.*brevifolia*), Royce's gum (*Eucalyptus roycei*), prickly woollybush (*Adenanthos acanthophyllus*) and golden lambstail (*Newcastelia chrysophylla*).

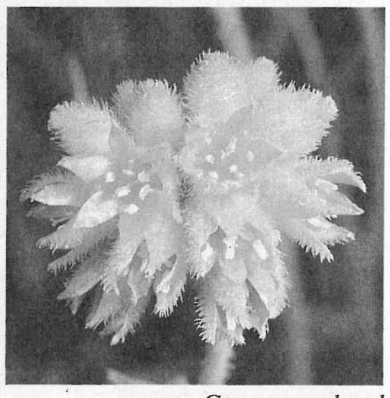
Selection

The best selection of these can be seen in an area between 24 and 29 kilometres from the Denham Road, on the road to Useless Loop.

Shark Bay's floral gems may be hidden from immediate view, but here, first impressions don't count.

It takes several visits, a detour from the beaten tracks and an enquiring eye to find out just what the Bay has to offer.

Native tomato



Grey cottonhead

Cobblers and coneshells

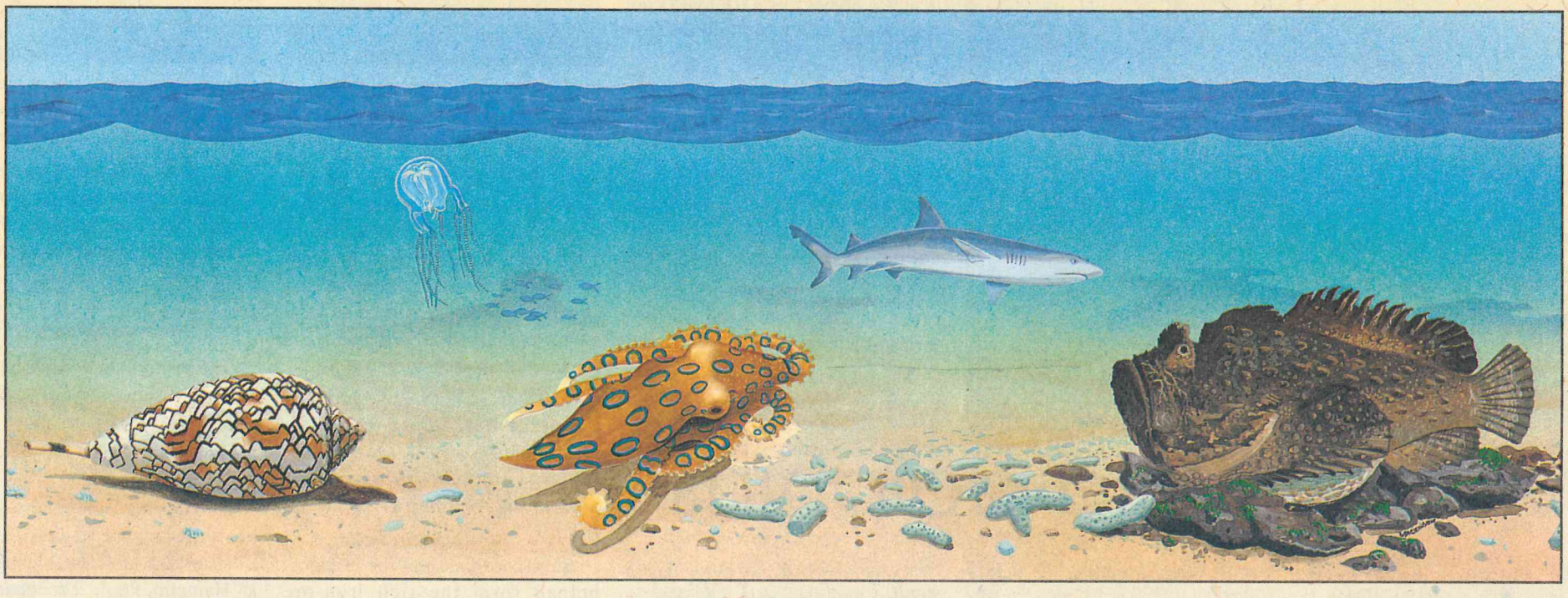


Illustration by Ian Dickinson

Many marine animals use venom and toxins for catching prey or defending themselves.

Some of these may cause mild stings or rashes if contact is made with human skin.

Only a few species have venoms and toxins potent enough to cause serious harm to people and these are not often encountered. However, it is best to be aware of problems they can cause and avoid coming into contact with them.

In Shark Bay, the most harmful marine creatures are the blue-ringed octopus and some species of fish-eating cone-shells.

These creatures kill their prey with a potent toxin injected with their bite, and they have killed people in other parts of Australia.

Blue-ringed octopus live on reef flats and in tidal pools in muddy areas and can be recognised by their brilliant blue rings when disturbed. Be cautious when handling dead shells and when exploring underwater crevices or caverns.

Coneshells are conical and cylindrical in shape. By day they bury themselves in sand and emerge at night in search of small fish, snails or worms. You should avoid picking up live coneshells.

Certain fish, such as catfish (or 'cobblers') and stingrays, have venomous spines and can cause painful injuries.

Stonefish

Stonefish are found around the top two-thirds of the Australian coast. They inhabit coastal reefs and shallow mudflats and usually lie partially buried on the seafloor.

Stonefish are said to be common in Little Lagoon, so small children should avoid playing in the shallows.

If people tread on this animal the sharp, venomous spines can pierce their feet, causing severe pain and tissue damage. Always wear strong footwear (not thongs) when walking in shallows.

Shoes will also provide protection from razor shells, which also inhabit shallows.

Seasnakes are also found at Shark Bay, and some species are dangerous to people. They are quite curious and may approach, but if you don't touch them they should leave you alone.

Bristleworms, ringed or segmented worms up to 20 centimetres long, often lie under rock or in corals. They cause injury either by penetration of the bristles or by biting. Be wary in turning over rocks or corals.

Sharks are common inhabitants of our coastal waters and some species are dangerous. To ensure they don't take too much interest in your activities, don't clean fish around swimming areas.

If you are unlucky enough to be bitten or otherwise poisoned by such animals keep the injured limb still and seek immediate medical attention. Silver Chain nursing posts are located at Denham and Useless Loop.

Sandhill frog

One of the strangest creatures in Shark Bay is the rotund sandhill frog, which spends most of its days buried in the sand on the dunes of Edel Land.

It lives entirely in sandhills, and is one of very few frogs that goes through its life without ever inhabiting free water.

The sandhill frog (*Arenophryne rotunda*) emerges to feed on ants and other insects when it rains or in the night dew. It does not have tadpoles. The young frogs hatch directly from large eggs laid buried in the sand.

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