

A Snorkeler's guide to plants and animals in South Australia's Marine Parks



**IMMERSE
YOURSELF**
in a Marine
Park



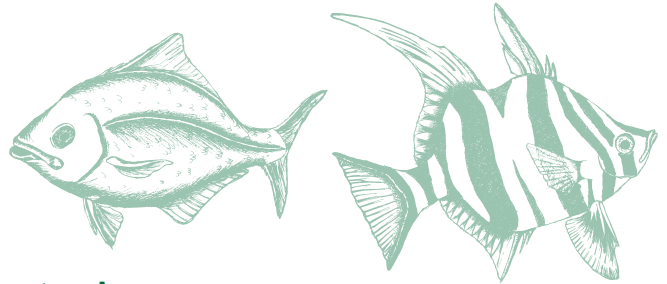
**National
Parks**
South
Australia



In our southern Australian coastal waters there are well over 10,000 species of plants and animals and most are found nowhere else in the world. In this guide we have included a small sample of the more common species that you might see when you immerse yourself in South Australia's marine parks. Enjoy!

Fishes

There are more than 600 fish species in SA waters!



Silver Drummer *Kyphosus sydneyanus*

This species is found on reefs across southern and eastern Australia, and New Zealand. This large silver-grey fish has a dark tail fin and faint stripes across the body. Silver Drummer grow to more than 80 cm long. The juveniles and young adults are commonly seen individually or in small to large groups but the largest adults rarely occur in shallow waters. Silver Drummer sometimes swim together with Sea Sweep.

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Zebrafish *Girella zebra*

An abundant fish often seen in small schools around jetties, on shallow rocky reefs and also in weedy areas. Zebrafish have 8-10 black bars along the side of the body and bright yellow fins. Although Zebrafish have small mouths, their hard blunt teeth help them to eat various tough foods, including seaweed and sea squirts (*cunjevoi*).

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Six-banded Coralfish / Moonlighter

Tilodon sexfasciatus

A round fish with a small pointed head and broad dark bands along the sides of the body. This species is similar to a tropical butterfly fish. The juveniles have large eye-spots near the top and bottom fins and a brighter yellow body than the adults. The larger adults (to 40 cm) are not common in the shallow waters of the gulfs, but the juveniles are often seen around jetties and on shallow reefs picking at the reef surface or the jetty piles for food.

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Victorian Scalyfin *Parma victoriae*

A territorial fish related to the tropical damselfishes but larger, to about 25 cm. Scalyfins are reef fish that defend their home cave against predators. They graze a crop of seaweed near the home cave to keep it from growing too high. The adults are a blue-grey colour, and the juveniles have an orange body with neon blue stripes and a blue eye-spot on the top fin.

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Western Talma / Truncate Coralfish

Chelmonops curiosus

Western Talma are found on reefs in Western Australia and South Australia, usually deeper than snorkelling depths but occasionally in shallow water. This thin deep-bodied silver and black fish has a long pointed snout, which is used to pick at small invertebrates. Western Talma have straight vertical edges to the fins, so another common name is the Squareback Butterflyfish. Juveniles have an eye-spot at the edge of the top fin which may help to ward off predators.

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Old Wife *Enoplosus armatus*

A black and white striped fish with a small head and long fins on top. The spines on the first top fin are poisonous. Old Wives are sometimes seen in large groups around jetties or in seagrass beds near reefs. Larger individuals sometimes swim slowly in pairs or singly around coastal reefs. The common name apparently comes from the grinding sound which the fish makes when stressed, such as when it is accidentally captured by fishers.

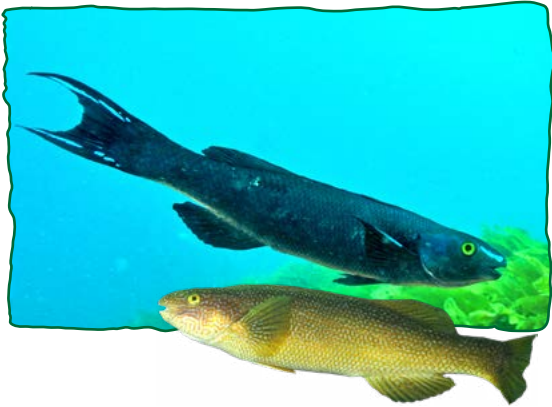
PHOTO 1: © J. Finn, Museum Victoria, CC BY Attribution



Dusky Morwong *Dactylophora nigricans*

A large morwong to 1.2 m long and also known as Butterfish or Strongfish. Juveniles have copper-coloured brown spots and bars on the sides of the body and larger spots on the tail. Adults are a silvery-green or greenish-brown colour with no spots. Dusky Morwong are often seen at the edges of reefs, over sand patches or in seagrass beds. They have a varied diet, which includes worms, small crustaceans and brown seaweeds.

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Herring Cale *Olisthops cyanomelas*

A common species in kelp and other brown seaweeds. Male Herring Cale are a deep blue-black colour, and females and juveniles are golden brown with blocks of darker brown on the top side. Juvenile and female cale are well camouflaged in the kelp plants through which they swim. This vegetarian species eats the blades and growing tips of brown seaweeds such as *Ecklonia*, *Cystophora* and *Sargassum*.

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Rainbow Cale *Heteroscarus acroptilus*

A fish which is often present on shallow reefs and in seagrass beds but hard to see, especially the mottled greenish-brown and reddish-brown females and juveniles, which blend in with marine vegetation. The males have two large spines and a dark checked pattern along the sides of the body. The base colour in males is variable and bright, commonly shades of blue, green and orange. Rainbow Cale have beak-like fused teeth, which enable them to eat marine snails.

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Mosaic Leatherjacket *Eubalichthys mosaicus*

A large leatherjacket species which occurs across southern Australia. Juveniles have a rounder body and brighter colours than adults, and are found closer to shore. Juvenile colouring and patterning is typically a regular arrangement of orange or yellow patches, separated by a blue or mauve network of lines. They are often seen picking around shallow reefs, searching for invertebrate food.

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Horseshoe Leatherjacket *Meuschenia hippocrepis*

Found on shallow reefs across southern Australia. The horseshoe-shaped mark on the body is most obvious in large males. Young juveniles have a pale pink body with blotches. This fish grows to more than 60 cm but is rarely seen at that large size. Horseshoe Leatherjackets feed on marine invertebrates by picking at the reef surface. They are curious and will often follow divers or snorkellers. If threatened, they retreat into caves or under ledges.

PHOTO: © A. Brown, CC BY Attribution



Leatherjackets such as Six-spine *Meuschenia freycineti*

There are several different kinds of leatherjacket fishes which are common in South Australia, in shallow reef areas and around jetties. Males and females of each species differ in colour and patterns. These fishes have a large spine behind the head with a small spine behind it to help the large spine stay upright when needed or flatten down into a groove on the leatherjacket's back. The small mouth has sharp beak-like teeth adapted for nibbling on invertebrates.

PHOTO: © J. Finn, Museum Victoria, CC BY Attribution



Blue-throated Wrasse *Notolabrus tetricus*

A large wrasse to about 50 cm long, found on reefs in south-eastern Australia as far west as South Australia. Juveniles and small females are commonly seen in shallow weedy areas and the large males usually live in deeper rocky reefs. Younger wrasse and females are olive green and red-brown colour with patches of white and a dark band along the side of the body. Males have a large round head and a dark bluish-grey body with a bright white band in the middle.

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Purple Wrasse *Notolabrus fucicola*

A greyish-blue or purple-brown reef fish with white or yellow blotches on top. Purple Wrasse are found across south-eastern Australia and New Zealand, especially on rough-water reefs with kelp and other large brown seaweeds. They eat crabs, smaller crustaceans and shellfish.

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Senator Wrasse *Pictilabrus laticlavius*

Found in kelp and other seaweeds on reefs across southern Australia. All Senator Wrasse are born as females which have a reddish-brown body with small spots. Over time, some females turn into males which are bright green with crimson or purple stripes along the side.

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Castelnau's Wrasse *Dotalabrus aurantiacus*

A small wrasse rarely more than 10 cm long. Juveniles and females are usually pale pinkish or creamy tan colour with dark brown or black broken bars and spots. They also have a dark eyespot on the end of the top and bottom fins. Males differ in colour and may be reddish brown, yellowish brown, bright green or orange. They have dark bands on the body which are more distinctive than those on females. This wrasse has a peculiar habit of bobbing up and down as it swims near and through seaweed.

PHOTO: © R. Stuart-Smith RLS, CC BY Attribution



Brown-spotted Wrasse / Orange-spotted Wrasse *Notolabus parilus*

A greenish or brownish coloured reef fish which is more common on shallow reefs in Western Australia than in South Australia. Males have a broken white band along the side of the body and gold coloured spots on the scales. Juveniles and females are mottled brown, green and white, without the gold spots. The common name is misleading as this species does not have distinctive brown spots.

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Sharp-nose Weed Whiting *Siphonognathus caninis*

A colourful fish which grows to around 12 cm long. Juveniles and females are red, green or brown with a pearly strip along the side, and males are orange to green with horizontal blue lines. Males also have a black spot on the top fin and a black patch under the rear of the body during breeding season. The Sharp-nose Weed Whiting is found across southern Australia, mainly around red and brown seaweeds on reefs in rough water areas. In some areas it has also been recorded in seagrass.

PHOTO: © R. Stuart-Smith @ RLS, CC BY Attribution



Pencil Weed Whiting *Siphonognathus beddomei*

A small slender species of weed whiting, with a long pointed snout. This species is found in seagrass beds and over reefs, mainly around beds of kelp and other brown seaweeds. Male Pencil Weed Whiting have a golden body with blue stripes, which are more obvious during the breeding season. The juveniles and females have a prominent eye spot on top of the tail.

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Blue Weed Whiting / Blue Rock Whiting

Haletta semifasciata

Found on sheltered reefs and in seagrass beds across southern Australia. One of the larger weed whiting species growing to more than 30 cm. Males are a bluish colour and females and juveniles are greenish with a silver stripe. This species feeds on a variety of small invertebrates such as worms, sea snails, crabs and other small crustaceans as well as algae.

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Magpie Perch *Cheilodactylus nigripes*

A common reef fish across southern Australia. Magpie Perch have thick rubbery lips similar to other members of the morwong family. There are two dark stripes on the body which can rapidly change colour by lightening the black bands to pale grey. Magpie Perch feed on the sea floor or on rock surfaces. They suck up a mouthful of sediment, extract the small invertebrates and then expel the sediment rapidly to form small clouds of sand in the water.

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Bigscale Bullseye *Pempheris multiradiata* and Rough Bullseye *Pempheris klunzingeri*.

Bullseye are small fish which have large eyes used for hunting plankton at night in the water. There are several species in South Australia, and Bigscale and Rough are the two most common species seen in shallow waters. Bullseye fishes are sometimes found in groups around the entrance to caves or under ledges. Juvenile Bigscale Bullseyes have bright yellow fins with black tips under the body. The bright fins are not present in adults, which are a bronze-grey colour.

PHOTO: © R. Stuart-Smith - Reef Life Survey - CC BY Attribution

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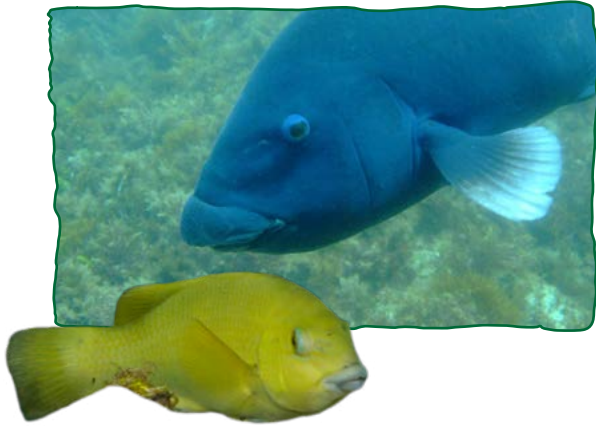


Yellowhead Hulafish / Noarlunga Hulafish

Trachinops noarlungae

A small schooling fish species found in Western Australia and South Australia. These fishes are usually seen under ledges or near the entrance to caves on shallow reefs, and sometimes aggregate in the hundreds. Although this species grows to 15 cm, most individuals are less than 10 cm long. The Yellowhead Hulafish is bright yellow towards the tail and many individuals also have a yellow head. Hulafish are so-named for their sinuous side-to-side body movements, like a Hawaiian hula dancer.

PHOTO: © H. Crawford, CC BY Attribution



Western Blue Groper *Achoerodus gouldii*

The Western Blue Groper is a large and long-lived fish, which grows to around 1.6 m long and can live to around 70 years in unfished areas. Young Juveniles are light yellow-brown, and older juveniles and females are greenish. Males are blue, sometimes with a white band on the edge of the side fins. All fish are born female and some change gender over time. Juveniles are sometimes seen around low seaweed-covered reefs in the shallow bays of north-eastern Kangaroo Island. The adults are mainly found in deeper waters, including reefs off headlands, but previously may have been more common in the shallows.

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Globefish / Slender-spined Porcupine Fish *Diodon nichthemerus*

These fishes can protect themselves in several ways. When threatened, a globefish can inflate its body to become ballshaped so that the spines stick out all over. It also has fused teeth in the beak-like mouth which can bite hard. As with other members of the porcupine fish family the flesh can be poisonous to eat.

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Southern Sea Carp / Marblefish *Aplodactylus arctidens*

A dark greenish-grey fish with blotchy patterns which occurs on reefs in south-eastern Australia and New Zealand. The Southern Sea Carp is a large fish, although rarely seen at the maximum size of 65 cm. This fish eats seaweeds and also small invertebrates living in the seaweed.

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Shaw's Cowfish *Aracana aurita* and Ornate Cowfish *Aracana ornata*

Cowfishes have a bony case around the body made up of six-sided connected plates. Both Shaw's and Ornate Cowfish are found in the gulf region. Male cowfish have blue and yellow patterns and females have orange, black and white patterns. Cowfish eat small invertebrates on the sea floor, and can blow a jet of water onto the sediment to help them capture their food. These fishes are poisonous to eat.

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Sea Sweep *Scorpis aequipinnis*

An abundant silver-grey fish often found in groups around shallow reefs and jetties. Juveniles have a diamond-shaped body. They are curious and often follow snorkellers when they are swimming. The largest adults, which grow up to 56 cm long are not usually seen in shallow water. Sea Sweep have a small mouth and they feed on tiny plankton in the water.

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Common Weedfish *Heteroclinus perspicillatus*

A small weedfish which is abundant on intertidal and shallow subtidal reefs in south-eastern Australia. Found in a variety of shallow habitats, it can change colour when moving between rocks, sand and seaweed to assist camouflage. Common Weedfishes are eaten by juvenile Australian Salmon and also by flatheads. There are other well-camouflaged weedfish species in shallow reef areas, but most are rarely seen.

PHOTO: © D. Muirhead, CC BY Attribution



Blue-spotted Goatfish / Red Mullet

Upeneichthys vlamingii

This species is commonly seen on the sand or rubble near reefs. Juveniles sometimes form schools in sheltered bays. Goatfishes have sensory barbels under the chin which help them locate food under the sand on the seafloor. This species can change colour from silver with a black stripe during the day, to bright pink-red at night.

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Threefins / Triplefins

such as Crested Threefin *Trinorfolkia cristata* and Black-throated Threefin *Helcogramma decurrens*

These small fishes grow to about 7 cm or smaller. Threefins are so-named for the three fins on top of the body. They dart around reefs and jetty piles and are often hard to see on reef surfaces with pink coralline algae and sponges. The Black-throated Threefin is found in Western Australia and South Australia, and the Crested Threefin mainly in South Australia. The well-camouflaged female Black-throated Threefin is mottled pink and brown whereas the male is bright yellow on top and black underneath. The Crested Threefin is pink and grey or gold-brown, often with a pale bar beneath the eye, and has a brown and white banded fin behind the head.

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Sharks and Rays



Port Jackson Shark *Heterodontus portusjacksoni*

Port Jackson sharks are found on reefs across southern Australia. They are usually seen when less than 1 m long but can grow to 1.65 m. Port Jackson sharks rest in caves and under ledges during the day and search for food at night. Main food items include sea urchins, crabs, molluscs and small fishes. These sharks migrate regularly and aggregate for breeding. Females produce brown spiral egg cases which they screw into rock crevices with their mouths. The egg cases are sometimes washed up on beaches or in rock pools.

PHOTO: © M. Norman, Museum Victoria CC-BY 3.0



Cobbler Wobbegong / Cobbler Carpetshark *Sutorectus tentaculatus*

Smallest of the three wobbegong species in South Australia, the Cobbler Wobbegong grows to less than 1 m long. It is sometimes seen laying in seagrass in shallow waters but is also found near coastal rocky reefs. This wobbegong appears to be more common in Western Australia than in South Australia.

PHOTO 1: © C. Hall, MLSSA CC BY-NC-SA

PHOTO 2: © CSIRO National Fish Centre



Southern Eagle Ray *Myliobatis tenuicaudatus*

A wide ray which grows to 1.6 m across. The body has a pattern of greyish-blue blotches on a darker greenish-brown surface. This ray is found near reefs and in seagrass beds, also under jetties and on bare sand in shallow water. Eagle rays have flat plate-like teeth for crushing crabs and shells. Female Eagle Rays produce about six pups at a time during summer.

PHOTO: © H. Crawford, CC BY Attribution



Southern Fiddler Ray / Banjo Ray

Trygonorrhina dumerilii

A light yellowish-brown ray with brown and white lines across the body. Southern Fiddler Ray grows to about 1.5 m. This ray is found on shallow sandy bottoms, in and near seagrasses and near reefs. It is also often seen near jetties. Juveniles feed on small prawns and shrimps, and adults eat crabs, small fishes and worms. Females produce around six pups at a time in autumn.

Photo: © M. Norman, Museum Victoria CC BY Attribution



Smooth Stingray *Dasyatis brevicaudata*

The Smooth Stingray is found around Australia, New Zealand, South Africa and associated islands. This large stingray grows up to 4 m long including the tail and 2 m wide, but is usually seen at smaller sizes. It lives in various habitats including sandy bottoms in bays and estuaries, jetty areas, and near coastal reefs. Smooth Stingrays eat shells (including abalone), crabs, lobsters, squid and small fishes. Females produce two to six pups at a time.

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Invertebrates

Thousands of invertebrate species have been found in South Australian waters and more are still being discovered every year!



Shell-grit Anemones / Speckled Anemones *Oulactis species*

There are several species of *Oulactis* anemones across southern Australia. These anemones are commonly found on and under rocks in sand in shallow subtidal reef areas. The tentacles and column (body) are sometimes greenish coloured due to tiny photosynthetic algae living inside. Small pieces of rock, shell or sand are often stuck on and between the tentacles which gives the Shell-grit Anemone its common name.

PHOTO: © J. Turnbull @ Flickr, CC BY-NC-SA 2.0



White-striped Anemone *Anthothoe albocincta*

An anemone from south-eastern Australia and New Zealand which is common on jetty piles and shallow reefs. The feeding area (oral surface) is orange, surrounded by white tentacles, and the striped column (body) underneath is attached to the rock or jetty surface. When disturbed, this anemone releases sticky white stinging threads.

PHOTO: © H. Crawford, CC BY Attribution



Zoanthus robustus

A colonial anemone (zoanthid) found on shallow reefs mainly in South Australia and Victoria. The animals have a greenish-brown colour due to the presence of algae. This species can make its own food with the aid of its photosynthetic algae during the day, and open its tentacles to feed on plankton at night.

PHOTO: © D. Kinasz, CC BY Attribution



Southern Anemone *Phlyctenanthus australis*

This species lives attached to reef surfaces in shallow waters in south-eastern Australia. It has about 100 red tentacles and the column (body), which is often bright purple-pink at the base, is also covered with grey-blue bubble-shaped vesicles. It can live for more than 15 years.

PHOTO: © H. Crawford, CC BY Attribution



Cartrut Shell *Dicathais orbita*

A shell to 10 cm long, abundant on shallow reefs across southern Australia. The Cartrut Shell is a predator which helps to control populations of other shells on rock surfaces. This species is long-lived to around 20 years.

PHOTO: © M. Lorenz, CC BY Attribution



Australian Tulip Shell *Pleuroploca australasia*

A large snail to 15 cm long with a dark brown shell. The soft animal inside the shell is dark red. It is found over a broad depth range on reefs, especially in south-eastern Australia. Tulip Shells hunt at night, feeding on other shells and on ascidians (sea squirts). They also scavenge dead animals on the seafloor.

PHOTO: © S. Edgeworth - CC BY Attribution



Pheasant Shell / Painted Lady

Phasianella australis and *P. ventricosa*

Two herbivorous snail species found on seagrass and brown seaweeds. Both are highly variable in pattern and colour. Shell shades of brown, gold, cream, pink and maroon are common. *Phasianella australis* grows to about 10 cm long and is more common than *P. ventricosa* which grows to 5 cm long.

PHOTO: © N. Tapson @ Flickr, CC BY-NC-SA 2.0



Kelp Shells *Phasianotrochus species*

Small shells 1.5 mm - 4 mm which live on *Ecklonia* kelp and other brown seaweeds or on seagrass. These shells graze on the algae which grow on surfaces of the kelp or seagrass. Kelp shells have long been used by Aborigines and Torres Strait Islanders to make necklaces.

PHOTO: © H. Crawford, CC BY Attribution



Conical Top Shell *Thalotia conica*

Small reddish-brown shells around 2 mm - 3 mm with a beaded pattern on the surface. This species is found on both seagrasses and seaweeds. In wave-sheltered areas, the shell is covered with fine filamentous algae or tiny stalked invertebrates (hydroids).

PHOTO: © R. Huet, AnimalBase <http://www.animalbase.uni-goettingen.de/>



Checked Periwinkles *Austrocochlea species*

Most periwinkles and top shells in South Australia occur in the intertidal zone, but a few species are also found amongst seaweed and on rocks on shallow reefs. Checked Periwinkles have a smooth dark shell with a regular checkerboard pattern of yellow or cream spots. These periwinkles graze on algae.

PHOTO: © L. Altoff MRG, CC BY Attribution



Warrener or Turban Shell *Turbo undulatus*

Round edible snails which have a dark green and white zig-zag pattern on the shell, often masked by a thin transparent brown coating. Turban shells are found in large numbers on many reefs, and are significant predators of kelp and other seaweeds.

PHOTO: © Museum Victoria, CC BY Attribution



Elephant Snail / Boat Shell *Scutus antipodes*

This snail grows to around 13 cm. The white shell is often covered by the black body known as the mantle. It lives under rocks and in crevices, and emerges at night to graze on seaweed. It can also catch floating seaweed in areas of strong current. Evidence of *Scutus* shells in Aboriginal middens indicates that this species was an indigenous food.

PHOTO: © L. Altoff, CC BY-NC 3.0 AU



WARNING!
Cone shells are venomous and some species are dangerous to humans

Cone Shell *Conus anemone*

Cone shells are mainly found in tropical waters. The New Holland Cone is one of the very few cone species which occurs in southern Australia. This cone shell grows to around 10 cm long but is often smaller. The shell colour is highly variable over the geographic range and may be white, cream, grey, brown, pink or golden orange, with darker patches or bands. Cone shells usually hide under rocks during the day and emerge at night to catch worms using a harpoon-like structure which is connected to venom sacs.

PHOTO: © S. Johnson, CC BY Attribution



Black Cowry *Zoila thersites* / *Zoila friendii thersites*

A distinctive cowry with a dark brown or black shell edge in adults and brown mottling over the surface. These cowries live on and eat a variety of sponges. Juveniles are orange and often well camouflaged. Black cowries are long lived to at least 12 years, and females brood their eggs until they hatch. The shell populations have been depleted in some areas of South Australia from over-collecting but inaccessible reefs, such as some of those around Kangaroo Island, provide a refuge.

PHOTO: © J. Baker, CC BY Attribution



Abalone such as Blacklip Abalone / *Haliotis rubra*

Flat shells with holes along the side to assist breathing. The inside of the shell has a pearly lining. These animals have a large muscular foot which helps the abalone to clamp tightly to rocks so that they are not dislodged by water movement or predators.

PHOTO: © P. Southwood, CC BY-SA 3.0



Velvet Sea Star / Cushion Sea Star
Petricia vernicina

A soft sea star with broad arms and smooth spongy skin. The Velvet Sea star is found on rocky reefs across southern and eastern Australia, especially on moderately wave-exposed sites. It feeds on a variety of encrusting animals on the reef surface, such as sponges, sea squirts and bryozoans.

PHOTO: © H. Crawford, CC BY Attribution



Five-armed Sea Stars *Nectria species, Pentagonaster dubeni, Uniophora granifera, and several others*

Various species of five-armed sea stars are commonly seen on shallow reefs in South Australia. Most are orange or red on the top side. In sea stars, the mouth is on the underside facing the reef surface. The stomach can be pushed out of the mouth to help sea stars feed on their prey. Sea stars have small tube feet which can emerge from a groove in each arm. The tube feet help the sea star move around.

PHOTO: © J. Baker, CC BY Attribution



Eight-armed Sea Star *Meridiastra calcar* **Common Six-armed Sea Star** *Meridiastra gunnii*

The Eight-armed Sea Star is variable in colour and can rarely have six, seven or nine arms. This species lives on reefs across southern, south-eastern and eastern Australia, and is often found in rock pools or under rocks. Even within one rock pool, individuals may have different body colours and patterns. The Eight-armed Sea Star eats many different plant and animal foods and is thus described as an omnivore. The Common Six-armed Sea Star is a dark red-brown colour. It raises its body to eat both plants and small animals which drift past and can be abundant in some areas where food is plentiful.

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Eleven-armed Sea Star *Coscinasterias muricata*

A large blue-grey and orange sea star (to 50 cm across) found over a broad depth range from the shore to about 150 m deep. This sea star commonly has 11 arms, but arm number can range from seven to 14. It will drop arms if stressed, and then regrow them. A whole sea star can regrow from one arm. This predatory species eats various molluscs, including mussels, scallops and abalone. It also scavenges dead animals on the sea floor.

PHOTO: © H. Crawford, CC BY Attribution



Biscuit Sea Star *Tosia australis*

A common five-sided sea star with short arms found on shallow reefs across southern Australia. These sea stars occur in many different colours (e.g. cream, yellow, orange, red, brown, pink, purple) and patterns (such as stars, spots, bands). Most individuals have several colours and a single colour over the whole body is rare. Biscuit sea stars eat sponges and other attached animals on the reef.

PHOTO: © H. Crawford, CC BY Attribution



Orange Feather Sea Star *Cenolia trichoptera*

The largest and most commonly seen feather sea star on shallow reefs. Individuals vary in colour, but orange, brown, red or yellow are common colours. Usually only the extended feeding arms are visible and the body (central disc) is hidden in a reef crevice.

PHOTO: © H. Crawford, CC BY Attribution



Schayer's Brittle Sea Star *Ophionereis schayeri*

A striped brittle star with snake-like arms which can grow to 15 cm long. Abundant under rocks in shallow subtidal reefs and also found in deep water. This brittle star moves by flexing its long arms. If an arm is attacked by a fish or crab and is removed, the brittle star can regrow another one.

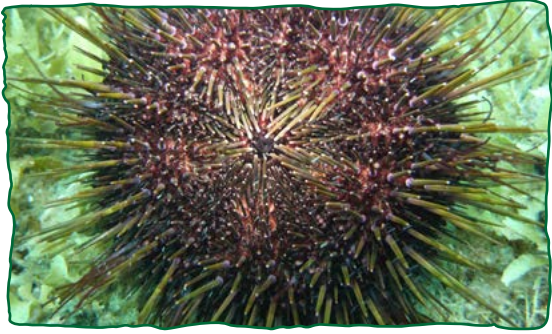
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Pored Sea Urchin *Holopneustes porosissimus*

This sea urchin is covered with bright red spines and is often found wrapped up in kelp fronds on shallow south-eastern reefs. It grows to about 8 cm. This sea urchin has many purple tube feet which help it adhere to surfaces and move around when needed. There is a beak-like structure in the mouth, which it uses to graze on micro-algae.

PHOTO: © A. Pearson, CC BY-NC-SA 2.0



Purple Sea Urchin *Heliocidaris erythrogramma*

A common sea urchin found on reef, rubble and other hard surfaces in coastal waters across the southern half of Australia. Purple Sea Urchins are sometimes seen clustering under ledges. They feed on seaweed, and dense aggregations of these urchins can strip the seaweed cover from patches of reef.

PHOTO: © D. Pearce, CC BY Attribution



Egg Urchin *Amblypneustes species*

There are several short-spined egg urchin species which live in seaweed and seagrass in South Australia. These urchins can use their long tube feet to wrap seaweed or seagrass around the body as a form of camouflage. They feed on algae.

PHOTO: © H. Crawford, CC BY Attribution



Slate Pencil Urchins

Phyllacanthus tubaria and *Goniocidaris irregularis*

These urchins have thick blunt spines around the body (which are called tests) and smaller spines at the base of the main spines. *Phyllacanthus* is found mainly in crevices on reefs and *Goniocidaris* urchins are found on reefs, rubble and rock walls over a broad depth range. Slate Pencil Urchins feed on encrusting invertebrates and also scavenge dead and dying animals.

PHOTO: DEWNR



Colonial Ascidians

The tiny animals (zooids) in ascidian colonies live together in groups. In large colonial species, the zooids are joined at the base but each animal is visible, whereas in compound ascidians the zooids are completely embedded in a jelly-like base called the matrix. The matrix is attached to hard surfaces such as reefs and jetty piles. In many species, the zooids have connections between them, and also expel their waste through large circular openings (cloaca) in the matrix. There are many ascidian species on shallow reefs in South Australia, especially under ledges and in other shaded areas.

PHOTO: © H. Crawford, CC BY Attribution



Solitary ascidians (Sea Squirts) such as Lumpy Sea Tulip *Pyura gibbosa*

Sea tulips have a long stalk and a rounded head with two openings called siphons. One siphon takes in water and extracts food. The food is filtered through a sieve-like structure inside the body. The other opening in sea tulips is directed upwards away from the feeding siphon and expels the waste water. Surprisingly, sea squirts are more closely related to fishes and other animals with backbones than to invertebrates.

PHOTO: © H. Crawford, CC BY Attribution



Sponges (various species)

There are many sponge species on shallow reefs and jetty piles, especially in shaded areas with strong water movement. Sponges are simple animals which have a skeleton made up of a fibrous material called spongin, usually strengthened with glass-like spicules. Sponges pump water through pores in their structure to extract food and expel the waste water through larger holes called osculae.

PHOTO: © A. Brown, CC BY Attribution



Green Coral *Plesiastrea versipora*

One of the very few hard coral species in southern Australia, Green Coral is a slow growing species which can form flat plate-like structures on reefs in shallow waters and larger spherical structures in deeper waters. Green Coral has a hard calcareous skeleton and the soft coral polyps live inside circular pits in the skeleton. This coral can extend its tentacles at night to feed on plankton and make its own food during the day with the aid of tiny photosynthetic algae living in the coral tissues. The algae trap the sun's energy and convert it into chemical energy.

PHOTO: © J. Baker, CC BY Attribution



Giant Cuttlefish *Sepia apama*

A large cuttlefish to 50 cm long, found swimming over reefs across the southern half of Australia. This species can rapidly change colour and pattern to blend with its surroundings. Breeding takes place in winter, at which time animals aggregate and males become territorial and aggressive. The females lay clusters of eggs in capsules on hard surfaces of reefs. Seasonally, the low rubble reefs off Whyalla support the largest breeding aggregations of Giant Cuttlefish in the world.

PHOTO: © R. Ling @ Flickr, CC BY-NC-ND 2.0



Southern Rock Lobster *Jasus edwardsii*

A common southern Australian and New Zealand lobster which grows up to 50 cm long, although is rarely seen at that size. It is found over a broad depth range from the shallows out to the edge of the continental shelf. This species has a complex life cycle, including a swimming larval stage which travels in the plankton for one to two years before settling. The next larval stage (called a puerulus) settles on reefs looking like a miniature adult lobster.

PHOTO: © H. Crawford, CC BY Attribution



Red Bait Crab / Cleft-fronted Shore Crab *Guinusia chabrus (Plagusia chabrus)*

A red-orange crab with short dark maroon hairs on the shell. Juveniles are a grey-brown colour. These crabs are found on shallow wave-exposed reefs, in crevices and on jetty piles across southern and eastern Australia. Red Bait Crabs are very fast-moving and can be aggressive. This species feeds on small animals such as hydroids, bryozoans and sponges.

PHOTO: © P. Southwood, CC BY-SA 3.0



Hermit Crabs *Paguristes species*

Hermit Crabs protect the soft parts of their body by living in a discarded shell from another animal. They commonly use gastropod shells including empty tulip shells, spindle shells and other whelks. One of the most common species, the Southern Hermit Crab, *Paguristes frontalis*, is found on shallow reefs and in seagrass beds across southern Australia.

PHOTO: © J. Lewis, CC BY Attribution



Smooth Seaweed Crab / Golden Decorator Crab *Naxia aurita*

A common decorator crab which camouflages itself by sticking pieces of seagrass or seaweed to its yellow-brown shell (carapace) with the aid of hook-like hairs on the shell surface. Smooth Seaweed Crabs are often found under jetties and are also common in American River on Kangaroo Island. They are found from just below tide level to around 100 m deep.

PHOTO 1: © K. Smith, CC BY Attribution

PHOTO 2: © Museum Victoria, CC BY Attribution



Sea Cucumber such as Southern Sea Cucumber *Australostichopus mollis*

Sea cucumbers are sausage-shaped animals with no skeleton other than tiny calcareous pieces called ossicles which strengthen the body wall. There are various species of sea cucumber on shallow reefs around South Australia. The largest is a reddish-brown or yellowish-brown sea cucumber with bumps on the body surface, which grows to around 20 cm long. These animals usually remain hidden during the day and come out at night to feed on organic particles.

PHOTO: © J. Baker, CC BY Attribution



Nudibranchs and other sea slugs such as *Ceratosoma brevicaudatum*

There are many species of sea slug in South Australia. Most are small and hard to see when snorkelling, although a few more obvious ones grow to more than 5 cm and are brightly coloured. One of the largest, the Short-tailed *ceratosoma*, grows up to 15 cm long. Nudibranchs are sea slugs with no shell inside and each animal is both male and female. Each type of nudibranch specialises in one kind of food such as sponges, hydroids, bryozoans or seaweed.

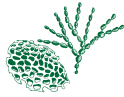
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Polychaete Worms

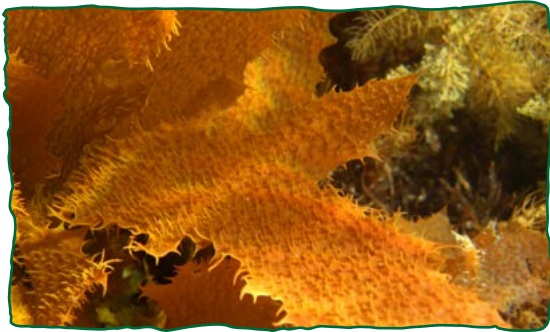
There are many kinds of segmented worms which live in shallow reefs areas, under rocks or in reef crevices. Some live buried in sand or rubble and others live in seaweed. Most are rarely seen. Some worms scavenge dead animals, others are active predators on other invertebrates, and some eat marine plants.

PHOTO: © L. Altoff, CC BY Attribution



Marine plants

Along our coast we have the largest mangrove stands in Southern Australia, 14 types of seagrass and more than 1,500 species of seaweed that provide essential food and shelter for our marine life.



Common Kelp *Ecklonia radiata*

Common kelp is a large plant (to 2 m high) found in abundance on reefs across the southern half of Australia and other temperate regions. It has a strong root-like holdfast which helps the plant to attach to reef surfaces, and a thick leathery stalk (stipe). Flat fronds grow off the stipe and are larger toward the top of the plant. Kelp plants often grow in groups, although in some areas are dispersed individually amongst other marine plants. Kelp is an important habitat for some reef fishes which seek shelter in the fronds, and small invertebrates live on and under the holdfast. Kelp is used commercially in some parts of the geographic range for cosmetics and for fertiliser.

PHOTO: © J. Baker, CC BY Attribution



String Kelp / Northern Giant Kelp *Macrocystis angustifolia*

A large seaweed, closely related to the Giant Kelp *Macrocystis pyrifera*. String kelp is found in cooler waters of south-eastern Australia. It grows to about 10 m long and has air-filled floats which help the long heavy fronds stay buoyant in the water. String kelp forms an important habitat for numerous fishes, crustaceans and echinoderms in south-eastern South Australia.

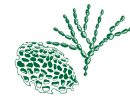
PHOTO: © H. Crawford, CC BY Attribution



Sargassum species

There are several common species of *Sargassum* on reefs in South Australia. The lower branches near the base of the plant are leaf-like and the finer upper branches form dense tufts. These plants have spherical vesicles to help keep the branches floating in the water. During winter, the plants die back and only the leaf-like branches at the base remain. *Sargassum* plants are home for many small invertebrates such as tiny amphipod crustaceans, worms and small snails.

PHOTO: © J. Baker, CC BY Attribution



Cystophora species

There are several common species of *Cystophora* on shallow reefs in South Australia. These plants often grow to around 2 m long and have zig-zag shaped branches growing off the main stem, with finer branchlets (ramuli) forming tufts along the branches. Like *Sargassum*, *cystophora* plants are home for many small invertebrates such as tiny crustaceans, worms and snails.

PHOTO: © J. Baker, CC BY Attribution



Crayweeds / Forkweeds

Scytothalia dorycarpa* and *Seirococcus axillaris

Scytothalia and *Seirococcus* are multi-branched brown seaweeds found on wave-exposed reefs. Both occur on reefs around southern Australia including reefs in South Australia at the bottom of the Fleurieu, Yorke and Eyre peninsulas. *Scytothalia* also occurs in Western Australia. Both species have reproductive structures in clusters on the edges of the flat blades.

PHOTO: © M. Norman, Museum Victoria, CC BY Attribution



Corkweed / Wartyweed *Scaberia agardhii*

This brown seaweed is common across southern Australia, on reefs which experience moderate to strong water movement. There is only one species of corkweed known to exist. The colour varies from dark brown to light golden-brown or greenish-gold. Corkweed has short rounded wart-like branchlets growing out of the main branches.

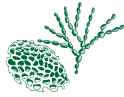
PHOTO: © K. Smith, CC BY Attribution



Grapeweed *Caulocystis* species

Caulocystis seaweeds are often found on shallow, wave-sheltered reefs. Grapeweed has a bottle-brush shape, with narrow cylindrical fronds growing off the narrow stems. The stems are joined at the base. There are two forms in South Australia. One has small ball-shaped floats to keep the plants upright in the water and the other has longer pointed floats. Intergrades between the two are common.

PHOTO: © D. Muirhead, CC BY-NC 3.0 AU



Brown turfing seaweeds *such as Lobophora variegata and Zonaria species*

There are several species of smaller brown seaweed which commonly grow attached to rocks. Together with some of the common green and red seaweeds, they form an understory layer under the larger brown seaweeds such as *Cystophora* and *Sargassum* in the canopy. The turfing brown seaweeds often have forked branches with rounded ends. A few species form flat lobed branches across rock surfaces.

PHOTO: © J. Finn, Museum Victoria, CC BY Attribution



Fern Caulerpa *Caulerpa flexilis*

A bright green seaweed with branches shaped like pine trees. Plants grow to more than 30 cm high although are usually smaller. This species is common on shallow reefs in wave-exposed areas across southern Australia and New Zealand. In some areas, the fronds get worn away by wave action leaving only a mass of root-like structures (stolons) at the base from where the new branches grow.

PHOTO: © D. Muirhead, CC BY Attribution



Brown's Caulerpa *Caulerpa brownii*

One of several green *Caulerpa* seaweeds which are common on shallow reefs in South Australia. Brown's *Caulerpa* has dense short fronds (ramuli) on the branches. Plants can grow to about 40 cm long, but are usually much shorter. When growing below the tide line, this *Caulerpa* can form substantial beds in some areas.

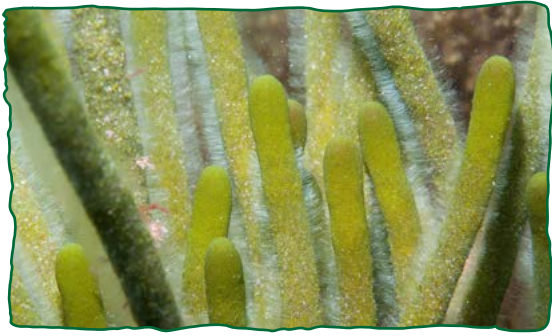
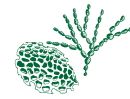
PHOTO: © J. Finn, Museum Victoria, CC BY Attribution



Liverwort Seaweed *Dictyosphaeria sericea*

A bright green lobe-shaped seaweed which attaches to reef surfaces using strong filaments called rhizoids. Liverwort Seaweed is usually found growing in clumps on the shaded parts of reef such as the underside of ledges and the sides of boulders. It occurs mainly in reef areas with strong wave exposure.

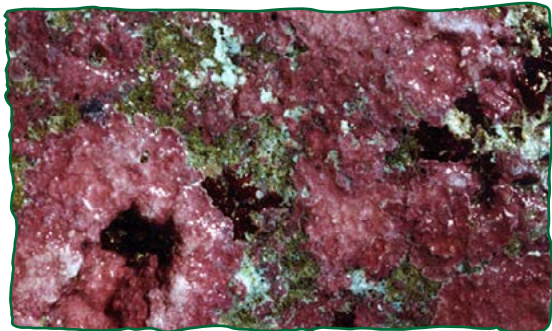
PHOTO: © J. Baker, CC BY Attribution



Codium species

There are various common species of green *Codium* seaweed in South Australia. Some have long, forked branches. Others are spherical, lobe shaped or flattened and sponge-like. *Codium* plants are spongy in texture. They have a core of fine filaments, and an outer layer packed with thousands of small, tubular structures called utricles.

PHOTO: © J. Finn, Museum Victoria, CC BY Attribution



Encrusting Coralline Algae

Encrusting Coralline Algae are also seaweeds, with calcium carbonate in the structure, which are brittle and can break easily. Some are flat such as *Lithothamnion* and *Mesophyllum* and grow as hard pink crusts on rocks. Others are more warty and knobby, such as *Lithophyllum*, and look like pink pebbles.

PHOTO: © R. Baldock, SA Herbarium, CC BY Attribution



Mermaid's Necklace

Chaetomorpha species, Chaetomorpha coliformis

An abundant and widespread species which is made up of chains of large transparent green cells. Mermaid's Necklace is often found growing on other seaweeds or on seagrass in the intertidal area or just below tide level.

PHOTO: © J. Finn, Museum Victoria, CC BY 3.0 AU

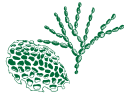


Serrated Red Seaweeds / Plocamium Seaweeds

Plocamium species

Plocamium seaweeds have flat branches with regular branching patterns. The small branchlets are called ramuli and in some species they are hook-shaped white, in other species the branchlets have a serrated (saw-patterned) outer edge. During the reproductive season, there are small grape-like clusters at the base of the branches. Small crustaceans such as isopods commonly live in *Plocamium*. Most *Plocamium* species are found on wave-exposed reefs.

PHOTO: © H. Crawford, CC BY Attribution



Red Grapeweed *Botryocladia sonderi*

Found on shallow reefs across southern Australia. This red species has dense grape-like clusters on branches. The bladders are filled with a gelatinous substance when the plant is young. In older branches, holes develop at the end of each bladder and they become hollow. The grape-like bladders often have encrusting red algae growing on the surface and the red colour may also be bleached out when the plants are growing in shallow waters.

PHOTO: © J. Finn, Museum Victoria, CC BY Attribution



Red Strapweed *Osmundaria prolifera*

A tough leathery seaweed with twisted branches. Red strapweed is abundant on shallow moderate energy reefs in Western Australia and South Australia. This species varies in colour from dark red-purple to pink and yellow according to the amount of light it receives. When out of water, the dark pigment rapidly bleaches out of this seaweed.

PHOTO: © H. Crawford, CC BY Attribution



Many-branched red seaweeds such as *Gracilaria*, *Gelidium*, *Laurencia*, *Wrangelia*, *Asparagopsis*, *Rhodymenia*, *Mychodia*, *Chondria* and other genera

There are many species of branched red seaweeds on shallow reefs in South Australia, and some of these grow together in groups. Some (such as *Wrangelia*) have fine fluffy branchlets which are easily damaged by wave action. Others are more robust such as species of *Laurencia* and *Chondria*. Most of these red seaweeds are less than 15 cm high. Some sea slugs eat red seaweeds, and small crustaceans, worms and shells often live in the branches.

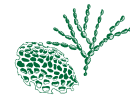
PHOTO: © J. Baker, CC BY Attribution



Spiky Tuftweed *Perithalia caudata*

A brown seaweed which grows to 1 m long on rough water reefs in south-eastern Australia. Small skeleton shrimps often live in this dense seaweed. Chemicals called phenols in the seaweed are distasteful to potential predators such as sea urchins.

PHOTO: © M. Norman, Museum Victoria, CC BY Attribution



Wireweed *Amphibolis* species

There are two species of the wireweed seagrass *Amphibolis* in South Australia. *Amphibolis antarctica* has short twisted leaves, and *A. griffithi* has longer straighter leaves. Plants are sometimes washed up onto beaches after rough weather which dislodges the roots from sand in the shallow waters. The tough wiry stems of uprooted plants sometimes roll together via wave action to form basket-like wireweed balls, although these are less common than other types of seagrass ball (see *Posidonia*).

PHOTO: © J. Baker, CC BY Attribution



Strapweed / Tapeweed *Posidonia* species

Strapweed is a long strap-like seagrass which forms meadows in nearshore sand areas. Most of the world's species of *Posidonia* are found in South Australia and some of these form large meadows, especially in the gulfs and in the bays of the west coast. *Posidonia* meadows have many important ecological functions such as providing feeding and breeding grounds for many marine fishes, crustaceans and other animals; protecting the coast from erosion; and helping to keep coastal waters clean. Seasonally, the leaves are shed in storms and wash up on beaches as beach wrack.

PHOTO: © D. Pearce, CC BY Attribution



Branched Coralline Algae *Cheilosporum sagittatum*

Branched Coralline Algae are seaweeds with calcium carbonate in the structure so they are brittle and can break easily. Some have many feather-like branches such as *Corallina officinalis* and *Haliptilon roseum*, and others have small cylindrical branches which grow upwards from the base such as *Jania* and *Metagoniolithon* species. Branched coralline algae are common on moderate to high energy reefs along the South Australian coast.

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Front cover: Leafy Sea Dragon (*Phycodurus eques*) and Giant Australian
Cuttlefish (*Sepia apama*). Photos by Carl Charter.

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