
MARINE
Life
OCT NOV 2018

You are the answer, not an Ocean Plastics Sucker

A Dutch not-for-profit group, The Ocean Cleanup will use a 600-metre-long floating boom and net to collect ocean plastic. The group says they can halve the Great Pacific Garbage Patch in just five years.

Source ABC

Environmental scientist and founder of the 5 Gyres Institute, Dr Marcus Eriksen, said The Ocean Cleanup did not understand the problem or how to tackle it effectively. "I think people still perceive that there are islands of trash out there and it's just the opposite … it's mostly small particles". "The net array that they've deployed, it's not going to capture the microplastics, and that's where I would argue the majority of the harm is coming from."

"If they want to build these structures, at the very least, the last place you put them is the mouth of rivers," Dr Eriksen said. "Even better, go further upstream and work on prevention to stop the problem in the first place. That's what's sorely needed, and that's where the conversation is today."

Jen Kennedy, executive director of the Blue Ocean Society for Marine Conservation, suggested they should also be mindful of their message to the public."I think this happens in a lot of situations where people just want this magic solution, which means they don't have to change their behaviour or do anything more difficult with their lives," she said.

But Mr Lebreton disagreed, saying that by showing the huge quantity of plastic retrieved by the project, the public can visualise the magnitude of the crisis.

"The idea is, if everything goes well with System One, to scale up to about 60 systems, and by 2020 … hopefully start a clean up of the Great Pacific Garbage Patch," Mr Lebreton said.

'Fun' Fact

Coconut crab find a modern home on a remote Pacific island

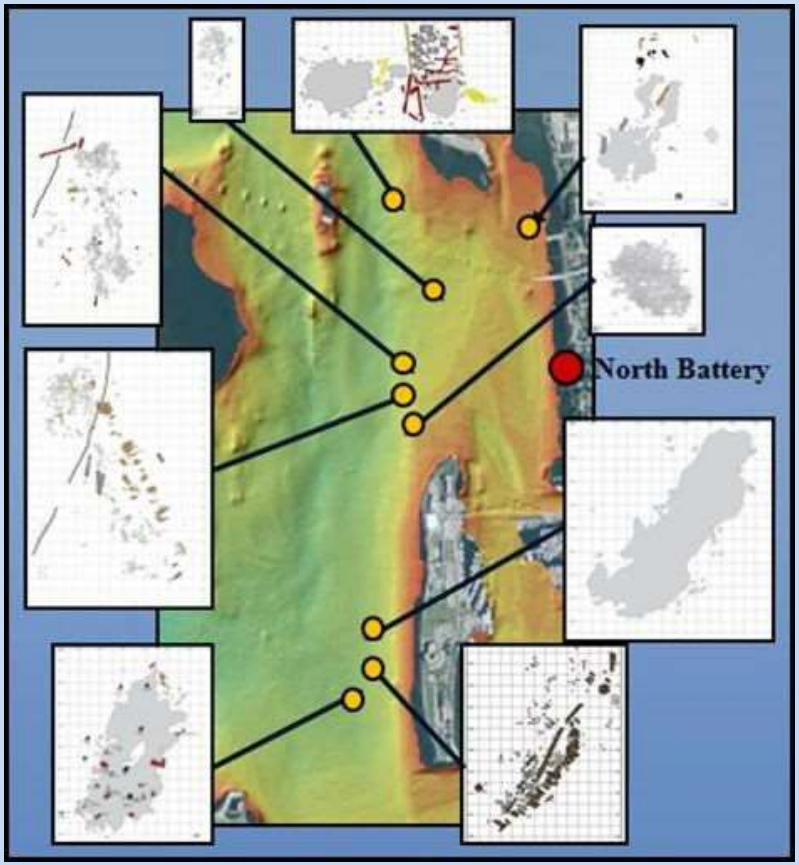
Dr Christian Schmidt — a hydrogeologist from the Helmholtz Centre for Environmental Research in Leipzig, who co-authored a 2017 study that found that nearly a quarter of ocean plastics came from 10 rivers in Asia and Africa.

Endeavour found?

During the American War of Independence Cook's "Endeavour" was scuttled. Now she has been rediscovered and everyone literally wants a piece of her

After its epic voyage through the South Pacific the "Endeavour" was worn out. She never really recovered from being grounded on the Great Barrier Reef. She was refitted and renamed "Lord Sandwich II". In 1778, the barque was then used during the American Revolution as part of a fleet sent to recapture Newport Rhode Island. Blockade ships were needed, so the old hack was scuttled across the harbour mouth to keep out the French fleet. Her final resting place was forgotten and she sank beneath the mud. The Endeavour is believed to lie north of Goat Island.

She shares the harbour now with a large number of other sunken blockade ships. Just to keep any search lively, the bottom is also strewn with old torpedoes discarded from a nearby torpedo factory.

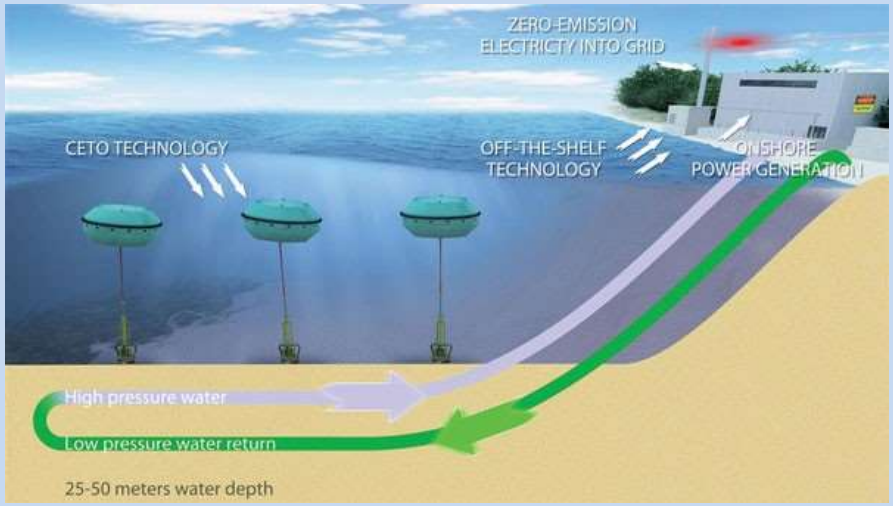


A no-anchoring and dive zone is securing the area, which has previously been damaged by dredging. It has taken decades to narrow the search down to two ships. They need more money to excavate the ship.

After that Australia, New Zealand, the UK and the US will all have competing claims over whatever is left of the Endeavour.

Wave power in trouble

Big losses have led to doubts that a WA wave energy innovator can survive.



In recent interim results, Carnegie posted a $64 million loss, including a $35 million write-down the intellectual property value of its CETO technology.Its share price has dropped from highs of 25 cents more than nine years ago to around 1.4 cents today.

Many of its investors have become angry at alleged failures in due diligence and misleading information about projects. They also didn't like the big paypackets taken home by directors.

A recent announcement was made that Carnegie was selling a majority stake in its solar microgrid company, Energy Made Clean (EMC), at a 75 per cent loss.

The technology has been through CETO 1, 2, 3, 4, 5, with CETO 6 supposed to be the commercial product. Carnegie's technology is still in the development phase, so the company has been financially supported by government grants and research and development tax breaks.

The company's grants include:

- Almost $29 million in Australian Renewable Energy Agency (ARENA) funding for projects off Garden island and Albany in WA
- More than $10 million in Low Emissions Energy Development funding and $15.75 million for the Albany project from the WA Government

Wave energy is currently about five to 10 times more expensive than solar and wind, according to Jeff Hansen from the University of Western Australia's wave energy research centre.

"To engineer things to survive in the marine environment, it takes a lot of effort and they have got to be very robust and I think that's one of the focuses," he said.

Perth-based David Harries, one of the architects of the Renewable Energy Target policy and a director of EMC before it was bought by Carnegie, said it would be a challenge to ever get the cost of wave power to be competitive with solar and wind.

Renewable energy consultant David Leitch said industry was questioning whether wave energy companies like Carnegie would ever be successful.

"It's a long way behind some competing technologies, so I don't think investors should be looking for any positive cash flow for 10, 20, 30 years.

An ARENA spokeswoman said the costs of wave energy were expected to come down with more global deployment.

Different kind of discoveries off Port Augusta wharf

So many shopping trolleys have been dumped off a wharf that the local council has warned of a "significant risk of injury" from swimming off it.

Divers employed by the Port Augusta City Council in conjunction with Coles, Woolworths and Big W have found about 500 submerged trolleys off the town wharf. "Being a recreational area and being the water, you'd naturally expect people to be swimming in that area and recreational fishing etc," Mr Johnson said.

Port Augusta Masters Swimming Club president Anne Baker said members tried to avoid swimming near the wharf because of the risk of cuts from the trolleys, which are covered in barnacles.

Port Augusta's last remaining jetty closed four years ago because it was structurally unsound.

The city is one of the hottest in South Australia and one of the farthest north location with sea access.

Fur seal spotted in Broome

The animal was spotted swimming off Broome Port two weeks ago, more than 2000 kilometres north of Perth, and thousands of kilometres from its normal WA habitat.

Mr Nutt said he was stumped as to how the animal wound up thousands of kilometres away from its usual habitat in the southern parts of Western Australia.

Despite the unusual circumstances, he said the seal looked in good shape

Holly Raudino is a research scientist with the Department of Parks and Wildlife and said the seal was definitely a fur seal.

Both New Zealand and sub-Antarctic fur seals are regular sights off WA, but never in the warm waters of the Kimberley.

Dugong oil anyone?

Photo: Julien Willem

In the 1800s hunters slaughtered dugongs in their thousands, selling dugong oil as a miracle cure for an array of ailments.

"They would sell just about all of it," James Cook University archaeology student Timothy Russell said. "The skin would be used for brakes on carriages and the meat was sold as steaks and bacon."

"That was started in the 1840s when the then-Chief Doctor of Queensland started promoting the idea that the oil had a medical use," Mr Russell said.

Hunters were based at Mackay, Moreton, Hervey Bay and Cardwell.

In 1931, there were requests for bulk supply from the United States and by 1946 the oil

As early as the 1880s, commercial hunting of dugong was already having an impact on the population.

"There were big complaints that the animals were becoming harder to find," Mr Russell said. "Dugongs don't breed until they're at least 22 years of age," said Cass Hayward, a coastal project officer with natural-resource management group Reef Catchments. "Even then, they only breed every five to seven years and often it's only one calf.

Newry Island, off the coast of Seaforth near Mackay was popular with hunters.

Mr Russell said it was only in the 1960s that commercial dugong hunting was officially stopped in Queensland. "Just 10 years after commercial dugong hunting was stopped, we saw the introduction of a ban on commercial whaling."

"It's important to know what happened in our town, and the knowledge that it happened is also important.

Shark attacks on dolphins rise in WA

Researchers from WA's Murdoch University Cetacean Research Unit monitored dolphin populations off the coast of Bunbury in the state's south west and Shark Bay in the north, and found shark bites increased each year from 2009 to 2013. It is also stated that this rise is in line with rising ocean temperatures.

Photo: Peter Lorimer

Dolphins in sheltered waters were "significantly" more likely to be bitten than populations in deep coastal waters. "In the two research areas, there was a 74 per cent bite rate off Shark Bay while in Bunbury it was 17 per cent," she said.

Dr Sprogis said dolphins "try to escape". "They will leap out of the water and alert other dolphins of the presence of sharks," Dr Sprogis said. "But if the water is shallow, they often can't turn quickly enough or they don't acoustically hear or detect sharks in proximity, so it might be harder for them to react and that would be a large reason in why they get bitten."

There was little difference when it came to the sex or age of dolphins but lethal bite marks tended to come from "large predatory sharks". Great whites and tiger sharks were believed to be largely responsible for the attacks in Western Australia.

Dr Sprogis said the research team had initially hypothesised the incidence of sharks attacking dolphins were unlikely to increase over the years, but between 2007 and 2013 predation increased as ocean temperatures also rose in line with the La Niña weather pattern. "The Leeuwin current [a warm ocean current found off the west coast of Australia] was bringing the warmer waters down with it," Dr Sprogis said."What we did see was an increase in shark bites on the dolphins. We also think that drew more tiger sharks into the areas with the warmer waters."

Photo Brad Jacobson

Deadly Storm at Newcastle

Newcastle was considered to be one of the most treacherous ports on the East Coast. The Northern side of the entrance is marked by a submerged sandy shelf, known as the Oyster Bank.

On July 12, 1866 a huge gale hit the East Coast; a storm which took 150 lives. Just at Newcastle alone, the Cawarra, Arthur, William Watson, Lismore, and Keder were all lost.

The Cawarra was an iron paddle steamer of 552 ton, built at Glasgow, Scotland in 1864 for the Australian Steam Navigation Company.

Struggling in the storm, she tried to make Newcastle harbour. When almost across the bar she was swept by a succession of enormous seas which threw her on to the Oyster Bank. The sea destroyed her within a few minutes, sweeping passengers and crew into the water. Wreckage and bodies of those lost littered a large area both in and out of the harbour. The sole survivor, seaman Frederick Hedges grabbed a plank as the ship sank and was eventually washed more dead than alive against a harbour buoy. Sixty-two lives were lost. During the following few days, over 30 bodies washed ashore. The flags on board the steamers in Sydney were kept at half-mast as a mark of respect to the officers and crew of the Cawarra. Eventually, a breakwater was erected against the Oyster Bank.

The site is marked by the above water remains of the Adolphe, which later grounded on top of her.

Those who died included 13 Chinese steerage passengers on their way to Brisbane, only Ah Fooh was noted papers by name. He was found with a miner's right in his pocket. They were probably on their way to the Crocodile Creek diggings near Rockhampton. As with all the other passengers they behaved bravely and calmly during the wreck. Some Chinese bodies washed ashore later, but they were paid little attention by the local papers and probably ended up in the mass grave with the other dead. The boundaries of this grave have since been lost.

Drawing by Terry Callen of Cawarra *foundering July 1866. [from* Bar Dangerous *by Terry Callen, Newcastle Region Maritime Museum;The Runciman Press, 1969, p 121]*

Who the hell is SAM?

Source ABC

Your grandmother has probably felt it in her arthritic elbow, climate change is altering the cold winds in the Southern Ocean, and how hard they hit SE Australia in winter. The winters down south are getting less cold and very dry.

No scepticism here, my farming family knows this weather effect, you can feel it in southern Tasmania. A big shift to the SW in winds in winter, and boy do those winds feel like they came from Antarctica. It's a time for bringing sheep off in towards shelter, or if you a city slicker, to dust off your snow skiis. We have all noticed that this weather has changed in recent years and winter in Tassie is no-where near as brutal as in the 'old days'. Now science has a name for it.

The Southern Annular Mode (SAM), also known as the Antarctic Oscillation (AAO). It is a name for a weather phenomenon that causes the north–south movement of the westerly wind that circles Antarctica. This is an important driver of rainfall in southern Australia.

In a "positive" SAM event, the belt of strong westerly winds retreats south towards Antarctica. This results in weaker than normal westerly winds and, let's face it, 'nicer' autumn and winter weather over southern Australia, unless you need moisture, like skiiers, farmers and power generators.

Perversely, a positive SAM in winter can bring more rain for northern New South Wales and into Queensland because of moist onshore winds.

It's different in the hotter months. A positive SAM in summer tends to bring above-average rainfall for the south, especially the southern and eastern half of Victoria, the eastern half of Tasmania, and much of New South Wales, as moist air in the Tasman can pushed onshore from the East. It can spoil that camping holiday. My mum knows this effect as 'wet doormat weather', soaking her coir mat on the usually sheltered side of the house. She knows she will be in for days of misty rains. My grandmother reckoned the horse backing in to the shed was another reliable warning of a long period of easterly rain.

Conversely, a "negative" SAM in winter sends the cold winds north. SE Australia gets strong and freezing westerly storms and rain, but in northern New South Wales, it tends to be drier because the moist onshore winds from the east are replaced by dry air from the west.

In recent years, a high positive SAM has dominated during autumn–winter, and has been a significant contributor to the 'big dry' observed in southern Australia from 1997 to 2010.

A negative SAM in summer has the opposite effect. It brings dry conditions to southern Australia because of enhanced westerly flow and high pressure systems.

SAM does not last for as long as the other climate drivers. El Nino (ENSO) can last for years and the Indian Ocean Dipole for months, but SAM generally only remains in one phase for a week or two.

The climate is changing and there is a trend towards more "positive" SAM events, especially during the southern hemisphere summer and autumn months. This has meant wetter than average summers and autumns in south-east Australia and eastern Tasmania, and drier summers in western Tasmania. The loss in ozone from CFCs, as well as increasing greenhouse gases, have been blamed for this trend.

Some more farmers yarns about signs of bad weather;

- *Expect rain when dogs eat grass, cattle sniff the air, and pigs are restless.*
- *If the bull leads the cows to pasture, expect rain.*
- *When cats sneeze, it is a sign of rain.*
- *When cattle lie down in the pasture, it indicates early rain.*
- *When pigs gather leaves and straw, expect a cold winter.*
- *If sheep ascend hills and scatter, expect clear weather.*

For my next boat trip, I'll just be boring and check the weather report.

Upper Gulf of St Vincent, South Australia

If you visit or live in Adelaide you are probably unaware of the upper eastern shore of the Gulf of St Vincent. It is the sort of place that you drive past on the way to somewhere else. It is a unique but troubled marine habitat.

On the fringes of Adelaide the tidal foreshore is being rapidly reclaimed for rubbish tips and light industrial estates. It's a great place for dumping refuse of all kinds, including stolen cars.

North West of Adelaide there are plains full of dry cereal farms, scruffy residual scrub and dead looking salt pans. The flat terrain is occasionally punctuated by dusty small towns who still talk about the 'good old days' and mean the copper and pastoral booms of the 1870s. Even the towns that were built with grand stone buildings look like the maintenance funds dried up in 1953, apart from a brief attempt in 1974 to ruin the facades with nice new aluminium windows and asbestos fibre cement sheeting. Wikipedia notes the highway as a good place for accidents.

It is where the army put a weapons proving ground. It's the sort of place you can happily bury or blow up and no-one seems to mind.

Then along came the marine conservationists and scientists, the spoilsports, who reminded everyone that even the most unlikely places can have unique natural values. It has some of southern Australia's best mangrove systems, is home to unique species, globally important bird habitats and it is also an important fish nursery. They have declared a marine park over much of the upper gulf.

It doesn't help that the really good bits are pretty inaccessible and hard to interact with. However, the best parts are actually still there because it's hard for humans to go there and **** it up. The most frequent visitors are fishermen, illegal shooters, illegal four wheel drivers and illegal rubbish dumpers. If it wasn't so damp at high tide, they would set fires too.

These wonders are lovingly signposted right next to vistas of encroaching heavy industry, one of Australia's largest sewerage farms, a planned new city to "rival" Adelaide [Ha, Ha], salt mines, rubbish galore and possibly the world strangest kiddies playground.

Barker inlet Tidal wetlands

As you leave Adelaide's northern suburbs, on the eastern side of Torrens Island you will see exotic birds happily paddling around a shrinking pond hemmed in by bulldozers and a giant motorway. A shelter beside the highway spruiks the natural values of the wetlands, while fresh mounds of earth encroach on the rubbish filled ponds.

Barker Inlet is a shallow tidal inlet adjacent to Port Adelaide, easily spotted thanks to the stacks of the power station and the nearby massive rubbish tip mounds. Oddly it is also listed as a nationally important coastal and marine wetland in the Directory of Important Wetlands in Australia.

The Kaurna Aboriginal people of Adelaide call this area Yertabulti a sleeping place but also a place of death. For Aboriginal people it is a

tranquil and serene landscape but there is a darkness there too, it's always been a place of grief. The area's features were created by spiritual ancestors to sustain the Kaurna, to destroy or change those features is sacrilege.

It is the largest area of sheltered tidal swamp in the Gulf St Vincent. It was declared an aquatic reserve in 1973. The 2055 ha reserve is an important fish nursery. It is also a haven for Port River dolphins. The 2005 Adelaide Dolphin Sanctuary Act established a sanctuary for the Bottlenose dolphins that live in the inlet and adjacent Port River.

Its sediments are soaked with a history of pollutants. Adelaide's principal sewage treatment farm discharged virtually raw sewerage here until the 1960s. The process is now much improved with the construction of the massive Bolivar Waste Water Treatment Plant. The treated waste is now discharged through a tidal creek just north of St Kilda.

In the muddy sediments, bacterial decay creates acid sulphate soils. Reclamation attempts only created land unsuitable for residential building. The effects of urbanisation have been felt including the loss of seagrass, sand movement, algal blooms, reduction in water quality, loss of mangroves, introduced marine pests, litter and excess nutrients.

Extraction of ground water from the deep aquifers for the last 50 years has also created land subsidence estimated at 2.8 mm/year. However, land subsidence may also prolong the life of the estuary by delaying the siltation, which eventually fills it in.

The sanctuary's northern extent is the boat channel and dolphins can sometimes be seen at high tide in the tidal creeks passing under the mangrove boardwalk at St Kilda.

St Kilda

St Kilda has a small town of 246 people and one pub. It was named after an island in the Hebrides because of the similar amount of bird life.

It is surrounded by salt crystallisation lagoons used in the manufacture of soda ash. The inhabited section of the suburb occupies less than 100 hectares along the seafront, with the remainder used for salt lagoons and the settlement ponds of nearby Bolivar sewage treatment works. It also has a very large and strange playground.

ICI began construction of the Solar Evaporation Lagoons at St Kilda in 1935 using up to 600 workers to dig out the lagoons by hand and then expanded them mechanically. The lagoons stretch approximately 30 kilometres (19 mi) north–south by 3 kilometres (2 mi) east–west along the coast. The lagoons are filled in spring and salt is normally harvested in autumn.

While this disturbance sounds appalling, St Kilda is still an internationally recognised bird watching area with over 100 species of birds feeding in and around the mudflats, salt lagoons, mangroves and seagrass beds. The lagoons are an important breeding and feeding area for species from as far away as Alaska.

Bird Habitat

Further north there are more bird habitats, the Adelaide International Bird Sanctuary. A northern section of the bird sanctuary has recently been proclaimed and is the state's first new national park in a decade.

The Bird Sanctuary sits right at the southern end of the East Asian-Australasian Flyway (EAAF) and is one of the key feeding and roosting sites for migratory birds who use the flyway each year. The area acts as a crucial habitat on this migratory route which is used by more than 5 million birds a year, 27,000 of those call the Adelaide International Bird Sanctuary home. The Bird Sanctuary helps protect Curlew sandpiper, Ruddy turnstone, Red knot and Eastern Curlew as well protecting productive mangroves, marine and coastal assets, river systems and many significant terrestrial species and ecological communities.

Ongoing habitat degradation along the length of the flyway is threatening some migratory shorebirds with extinction, and a disproportionately high number of shorebird species have been classified as threatened along the flyway such as the curlew sandpiper, eastern curlew and great knot. To support the conservation of migratory shorebirds, international collaboration is critical to ensure a coordinated response along the entire flyway.

Access to the sanctuary is limited, via Middle Beach, St Kilda and Thompsons Beach. Most of it is shallow mangroves are inaccessible except by boat.

The northern gateway of the sanctuary is well north at Thompson Beach. It is some of Adelaide's more pristine coastline featuring samphire and intertidal mudflats.

Mangroves of Port Gawler

A lesser known point to reach the coast is the abandoned landfall of Port Gawler is the start of the Samphire Coast. It is here that the Gawler River enters the Gulf of St Vincent via a small delta and is very popular for crabbers, fishers and bird watchers.

Port Gawler was named in 1867. In 1869, the 'Lisbon' wharf and Waterloo Road were constructed with a grant of £6,000. In its heyday, Port Gawler was filled with small ketches taking cargoes of grain across the sand bar at the mouth of the creek at high tide. Between December 1874 and November 1875, about 295 boats loaded at Port Gawler. When the railway arrived the port died in the 1920s.

Nearby is the only off-road hire park for motor bikes, four wheel drive vehicles and go-carts in South Australia.

According to one site, "Today, the main activities seen in the area are fishing, vandalism and burning of stolen cars...there is a boat ramp and access for kayaking."

Fishermen's anecdotes suggest there is now very little fish to be had in the area "due to pollution". They blame car bodies and general dumping of rubbish in the area. I'd suggest overfishing might be a larger part of the story, but it certainly is degraded.

It's probably a good thing that relatively little of this coastal reserve is accessible.

Light River Delta

The Light River Delta, which is considered one of the most ecologically-intact mangrove and saltmarsh systems in South Australia.

The Light River (Yarralinka) is barely a river and is mostly sucked dry by farmers in this arid watershed. In the coastal section the river breaks into a number of smaller channels, and floods approximately every four years, entering Gulf St Vincent through numerous tidal channels. To early bullock teams carting copy its mud earned it the name "The Dirty Light".

Mangrove (Avicennia marina) forests are located at the Light River estuary and cover approximately 1.3 km (0.2%) of watercourses. Samphire (Sarcocornia sp., Halosarcia sp.) marshes occur on the tidal flats and cover approximately 2 km (0.4%). Mangrove forests provide important breeding grounds and habitat for fish, birds and macroinvertebrates and protect the coastline from the erosive influence of the marine environment. Samphire marshes provide organic matter to the estuary food chain, filter sediment from land-based runoff and are an important habitat for insects, small vertebrates and birds.

Dublin and Port Wakefield

At Dublin near the Light River, protest sculptures erected to unsuccessfully stop a waste dump have now become a cultural landmark.

Soon you are in Port Wakefield, where ketches once swarmed up the mangrove lined channels to load wool and copper. The town has a dusty long-bypassed look about it now, but a drive around the well-laid streets still reveals some of its fallen former grandeur. It is a good spot to launch a boat for a day out on the shallow mangrove channels and sandbars.

The Upper Spencer Gulf is a strange place, where a giant metal cockroach doesn't actually look that out of place and where many a sci-fi movie could be shot. I suspect the Aboriginal first Australians have or had many stories of dark spirits and water demons.

What is amazing is how such a damaged area can be so full of life. It might be that with a new marine park and national park this unique area might no longer be treated like a wasteland.

Diving and snorkelling the area

You can also dive among the protected pipe fish that live in the sea grass habitats of this park or the razor fish beds in the intertidal mudflats and near-shore seagrass meadows. There are magpie fiddler ray which has not been recorded elsewhere.

The Upper Gulf of St Vincent Marine Park is located within the Gulf of St Vincent Bioregion. Gulf St Vincent is an inverse estuary with higher salinity at the top of the gulf. The upper reaches of the gulf are influenced by high salinities, temperatures and large tidal ranges.

It's a place of strange chemistry where many juvenile sea animals are born.

The Upper Gulf St Vincent contains some of the most extensive seagrass meadows in South Australia.

A male Sharpnose Weed Whiting, Siphonognathus caninis,

Rick Stuart-Smith / Reef Life Survey

Awesome Asteroids - Rare and Threatened little sea stars

No I didn't make it up or change the emphasis, Tasmania in particular has some really rare and weird seastars, some of which have already gone the way of the Thylacine. Even though some scientists say it's almost impossible to make a marine species go extinct there is plenty of evidence that this isn't always the case. The culprit is invasive pest species.

Derwent River sea star *Marginaster littoralis*

This seastar occupies five known locations throughout Tasmania's Derwent River. Its only 17mm across and is the only echinoderm currently on the Australian species endangered list. It may already be extinct.

Each remaining colony is crucial for the species' survival. Unfortunately, three of the populations were last located in 1969, with the remaining two last seen in the early twenty-first century. It is thought that the species occupies just 0.01 square kilometres if anything.

The species dwells in rocky waters which are less than 1.5m in depth, which may be natural or a response to competition from feral seastars.

It is blue to green in colour, with its underside off-white, which extends to the outer edge of the arms. There is brown colouring around the spinelets on its outer surface.

The species possess an extendable stomach, and it is thought to feed on algae and other small particles.

Competition from introduced species is the main threat to the Derwent River sea star (if it still exists). The New Zealand sea star (*Patiriella regularis*) was introduced in the early twentieth century and is biologically very similar to the Derwent River sea star, and consequently it is believed that the native species may have been genetically swamped by the invader.

The destruction of the species' habitat is a further threat. Populations in the Derwent River are located close to Hobart, and are subject to run-off pollution. There is no recovery plan in place to protect the species.

The Tasmanian Live-bearing Seastar

It is a tiny, uniformly orange-yellow seastar, up to 15 mm across found only in very shallow water. The Tasmanian Live-bearing Seastar is known from 13 isolated subpopulations within Southern Tasmania. The area of total habitat is estimated to be 1000–2000 m^2. The species' subpopulations are small and isolated. The sites are separated by distances that exceed the estimated dispersal capacity of the species.

Image by Nuytsia@Tas

It is one of two Australian sea stars that bear live young, *Parvulastra vivipara* and *P. parvivipara* . *P. parvivipara* is also among the world's smallest adult sea stars.

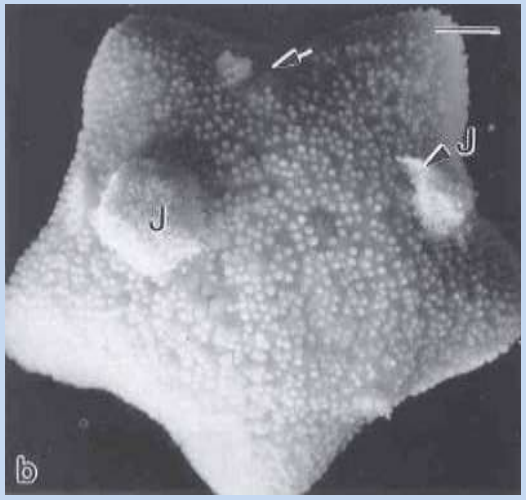
Both Species are self-fertilizing hermaphrodites, simultaneously both male and female They have between 6 to 8 female gonads and 1 predominantly male gonad.

They brood their young juvenile in a brood chamber. The adult "carries" either internally or externally several tiny juvenile starfish with it until they are ready to move off on their own as full adults.

It’s not all a placid tale of animal maternalism. There isn’t enough food for the juveniles so they start to eat their siblings, a bit like some shark young. Hence the rush to reach about 25-30% of the parent's body diameter so they can leave home. Eventually, they are born through openings in the body wall. Sometimes a really big one continues to grow inside the parent, and becomes a permanent parasite.

The downside of having brooded juveniles is that they tend not to go very far from the adult. Self-fertilization by hermaphroditic adults and brooding behaviour causes strong inbreeding and "genetic poverty" (very Tasmanian).

The populations of these live-bearing starfish species is pretty small and restricted. Potentially any kind of abrupt habitat change could wipe out these starfish with their unusual ways of living.



From Byrne 1996

Penguin Island's missing penguins

They're small, cute, tourists love them, and they have halved in numbers in the last decade.

Source ABC, Photos West Matteeussen and Pamela Medlen

The 12-hectare Penguin Island lies just 600 metres off the coast of Rockingham, in Perth's south. The island is home to about 1000 little penguins, the largest colony in WA. It is also a temporary stopover for about 130,000 visitors a year. The penguins are just as loved as before but their numbers are falling.

Dr Belinda Cannell said rising ocean temperatures are playing havoc with their breeding. In 2011, the coast was hit by a marine heatwave, "Since then those sea surface temperatures have been above average in most years and particularly in the winter months, so this is what we're thinking is really impacting the penguins' availability to get food close by and therefore to breed".

The heatwave culled several species of small fish that make up the little penguin's diet. "Their main resource was whitebait — they also eat pilchard and anchovy and blue spratt — but with the marine heatwave, we saw an increase in the tropical sardine in their diet which we had never been seen before."

She said the penguins needed to travel further and further from the island to find food, sometimes hundreds of kilometres down the coast as far as Busselton or Margaret River. "That's a long way for a little penguin to go and they're away for 15 days sometimes. That means the partner's sitting on the eggs and getting to a point where they have to abandon the eggs because they're just too hungry," she said.

"Then once the chicks have hatched they have to stay closer to the island, … and if they haven't got enough food they either stay out for longer or they come back and there's less food to feed the chicks."

More frequent and severe storms, also caused erosion. "That means that these little cliffs form, but the penguins can't get up the cliffs to their nest boxes or their nesting sites because they can't walk up these vertical cliffs, so that means they can't get back to swap with their partner or feed their chicks," Dr Cannell said.

Dr Cannell said about 25 per cent of penguin deaths were due to boat injuries. "[People] need to be slowing down and be aware the penguins are often just a metre under the surface of the water and they're difficult to see.

"Taking away your fishing line, don't leave your plastic pollution around because the penguins get entangled in that, and making sure that any coastal development we have is sensitive to where the penguins are."

"There's extensive boardwalks around the island now so that gives people access to all of the great lookout spots and all the fantastic beaches, but it also keeps them up off the areas that are used by penguins."

"We need to try to do everything that we can to improve the breeding success of these birds and have this colony here for another 100, 200, 300 years to come." However, money for study is thinning out too.

Get the trailer out of the shed and take the robot for a spin

Lake St Clair in Tassie is the final dress rehearsal for a $5 million AUV before it explores uncharted parts of the east Antarctic environment, providing scientists with critical information on ice shelves and their impacts on global climate.

Erica Spain, a student at the Institute of Marine and Antarctic Studies, has been working on the AUV for 18 months as part of the Antarctic Gateway Partnership and will make her first trip to Antarctica this summer.

Ben Galton-Fenzi from the Australian Antarctic Division said the AUV would collect data that would inform sea level projections for the next 100 to 200 years.

The information will be used to assess how ice shelves in the region contribute to sea levels.

It will be the first time an AUV of this type has been deployed in east Antarctica.

Designed in Canada, the AUV is state of the art and unique in the Southern Hemisphere.At more than six metres long, it weighs two tonnes and is capable of reaching depths five kilometres below the surface. "It's really exciting for us because there's large regions we just don't understand," Dr Galton-Fenzi said.

It is powered by lithium batteries and can travel for 150 kilometres or 24 hours without needing to be recharged.

Why don’t they show this in the tourist brochures?

State of the Derwent River

Source ABC

Work goes on to clean up a legacy of 1970s pollution and lots of current people pressure. Looks bad? Well it use to be a lot worse.

Like many Australian rivers in the early days, the Derwent was used as place to dump waste. As early as 1824 its water was deemed undrinkable because of pollution. The advent of heavy industry, the growing population, urban and agricultural development have, had a big impact on the waterway since.

The zinc works, left a legacy of heavy metals in river sediments. The Derwent Estuary Program (DEP) is trying a collaborative program to raise standards. Chief executive officer, Ursula Taylor, says "The Derwent sediments are highly contaminated and are probably some of the most contaminated sediments you can find anywhere," she said.

The zinc works are owned by Nyrstar and operate very differently to how it did in its early days. "That [contamination] level has actually been going down. We find that most contaminated sediments are 10 to 20 centimetres below the surface”. They can’t now be disturbed by activities like dredging.

One of the major impacts has been on the groundwater under the plant, so much material leached into it that it can be reprocessed. The plant recovered 104 tonnes of zinc last year just from groundwater.

They can be hard to find elsewhere, but there are plenty of crayfish under the Tasman Bridge. But they are laced with heavy metal pollution and can’t be eaten. (Photo Millie Banner)

Stop it, Stop it, my grandad gave up fishing here as a bad joke in 1930.

Fisherman Plinio Taurian is worried not enough is being done. "The story coming from the Derwent Estuary Program is everything is rosy, everything is getting better, and I just don't see that is the case," he said.

Mr Taurian is an avid fisherman.He has a lot of concerns, but mainly about the changes in weed beds and seagrass. A recent two-year study confirmed high nutrient levels some caused by salmon hatcheries upstream were causing an algal growth to smother sea grass, making it uninhabitable for fish.

The EPA said salmon farming generally did not contribute to nutrient load in the Derwent, with the nutrient levels reported in the research was mainly in the area above New Norfolk.

"Algal growth can form a big green mat and smothers sea grass and they are important habitats for fish breeding important for birds," Ms Taylor said.

The DEP say "In winter nutrients from agricultural sources tend to dominate in the river system and in the summer fish hatcheries contribute nutrients as well, but it's multiple sources of contamination I guess.

While the heavy metal issue remains, so do the warnings about seafood. Shellfish are a definite no-no and bream are also off the menu because they live longer and accumulate heavy metals. The health advice for flathead is to limit consumption to two meals per week, but young children and pregnant women should not have any.

Winter festival swim, it's all art, so no indecency complaints, unless its about the indecent cold or heavy metal levels entering through unprotected areas.

For swimmers it pays to heed warnings after heavy rain, "Water runs off roads and creeks and that's not treated, and it picks up pollutants along the way from garden, animal faeces — sometimes sewers can overflow, if there has been a big storm it can overflow," Ms Taylor said.

Stinky Whales

Apparently a dead whale smells like mouldy cheese, rotten meat and seaweed but its bread and butter for some.

Source ABC

Located in Bolivar in Adelaide's north — next to the city's largest waste treatment plant — a museum warehouse has helped to prepare and display the best collection of whales and dolphins in Australia.

SA Museum Collection manager David Stemmer is currently processing a rare find, a complete adolescent humpback whale carcass almost 12 metres in length.

"It gets all cut up over several days, literally bone-by-bone gets extracted out of the whale, then transported back on a big trailer, a car trailer in this case," Mr Stemmer said.

From there, as much flesh is removed as possible, and what's left is soaked in water in the maceration tank for months.

After that comes cleaning and cataloguing, with the entire process taking up to two years.

"The only problem with whale oil and the smell is that it's very persistent and it goes through everything. It gets stuck in your clothes, it even gets stuck in your skin.

"My wife is not terribly happy about it either. I try to clean [my clothes] as best as I can, but some of the really bad pongy ones just end up in the bin."

Rats killing seabirds fast

Rat control should be considered an urgent conservation priority on many remote tropical islands to protect vulnerable coral reefs, according to an international research collaboration.

Invasive predators such as rats – which feed on bird eggs, chicks, and even adults birds – are estimated to have decimated seabird populations within 90 per cent of the world's temperate and tropical island groups.

A new study also examined other aspects of the tropical ecosystems in the northern atolls of the Chagos Archipelago to uncover how rats have impacted surrounding reefs. By examining soil samples, algae, and counting fish numbers close to the six rat-free and six rat-infested islands, scientists uncovered evidence of severe ecological harm caused by the rats, which extended way beyond the islands and into the sea.

Rat-free islands had significantly more seabird life and nitrogen in their soils, and this increased nitrogen made its way into the sea, benefiting macroalgae, filter-feeding sponges, turf algae, and fish on adjacent coral reefs.

Fish life adjacent to rat-free islands was far more abundant with the mass of fish estimated to be 50 per cent greater.

The team also found that grazing of algae – an important function where fish consume algae and dead coral, providing a stable base for new coral growth – was 3.2 times higher adjacent to rat free islands.

Cuttle numbers at Whyalla are rising again.

The South Australian city of Whyalla is bracing itself for an influx of more tourists wanting to see one of the world's great wildlife spectacles, the annual giant cuttlefish spawning.

Source ABC

Every year between the months of May and August, tens of thousands of colourful cuttlefish make their way to a small section of rocky reef near Point Lowly in the upper Spencer Gulf, about 30 kilometres north-east of Whyalla.

Their chief purpose is to mate multiple times; the females lay their eggs under the protective rocks and by the end of the season the adult males and females die before the next generation hatches.

"They live fast and die young," Dr Steer said."And, like rock stars, they are parading around, trying to get matings, and they're colourful," Professor Gillanders, from the University of Adelaide, added.

Professor Gillanders and her team have been researching the region's cuttlefish, "When they are at their peak there is literally one cuttlefish per square metre, and I still get excited going and seeing them," she said.

Annual surveys taken since 1998 reveal erratic changes in population. The numbers peaked at just under 200,000 animals at the turn of the century but dropped to around 13,000 in 2013.

The population started to bounce back in 2014 and has remained at healthy levels since.

"One of the things that is really great about the cuttlefish is that we have always had this reputation of being this dirty old city, industrial city," Mrs Breuer said.

"This is completely different and it has changed the way we look to the rest of the world."

While the cuttlefish are located only 20 to 30 metres away from the shoreline, so can be easily viewed by snorkelers walking in off the beach, the Mayor said the Council was looking at options such as a glass-bottomed boat or a transparent walkway so visitors not wanting to get wet could still see the cuttlefish in their natural environment.

Council had not collated any firm figures on the number of cuttlefish enthusiasts visiting Whyalla, but motels and other accommodation reported high occupancy rates over the winter months.

For long-term owner of Whyalla Diving Services Tony Bramley, the influx of visitors has been an absolute boon. "We can get thousands of people over the season," Mr Bramley said.

The State Government instituted a permanent, year-round exclusion zone for the fishing of cephalopods in the False Bay spawning grounds.

A wider temporary ban, which extends to all the gulf waters between Wallaroo and Arno Bay, will be reviewed early next year.

"It just seems to me that whatever protection has been put in place, it is doing the job now," Mr Bramley said. "The last three years have been very good."

Dredging Guidelines can save fish

Dredging operations worldwide are forecast to intensify in the future and there is plenty already happening in the iron ore ports of NW WA.

A global study has assessed the potential risk from dredging to coastal fish and fisheries and identified guidelines that could protect 95 per cent of fishes from dredging-induced mortality.

The study found that more than 2,000 ports worldwide are within the range of at least one threatened species, while 97 ports are located within the range of five or more threatened species.

Globally, between 40.9 million tons of global commercial fisheries catch and 9.3 million tons of small-scale fisheries catch were extracted within five kilometres of a port, including many species known to be sensitive to sediment.

Dr Wenger said fish larvae were most likely to be affected by dredging sediment but that there were measures that could be taken to markedly increase the survival rate. "We found that maintaining suspended sediment concentrations below 44 mg/L and for less than 24 hours would protect 95% of fishes from dredging-induced mortality. "Seasonal restrictions during peak periods of reproduction and recruitment could also protect species from dredging impacts," Dr Wenger explained.

Loss of Kelp forests makes climate change worse

A global study has found that kelp forests take in more than twice the amount of carbon dioxide than previously thought, but they are disappearing fast.

Kelp forests occur in cold, nutrient-rich water and are among the most productive ecosystems on Earth, absorbing vast amounts of carbon dioxide in order to grow.

Lead author Albert Pessarrodona from UWA's Oceans Institute and the School of Biological Sciences said, "So far, the oceans have captured around 40 per cent of the carbon dioxide emitted by humans, so figuring out how carbon moves through that system is hugely important." "That carbon can then be channeled into habitats where it is locked away from the atmosphere (carbon sinks), playing an important role in mitigating the effects of global warming."

"What is really concerning though, is that kelp forests living in warmer waters contain on average three times less carbon than those living in colder waters.

"This suggests that future ocean warming will decrease the capacity of kelp forests to absorb carbon, particularly in areas where forests are already under stress from warmer temperatures, such as Portugal or the Australian mid-West."

The scientists studied kelp forests from Norway to Portugal and in eight locations spanning 900 kilometres along the coast of Great Britain.

Some Corals Hardy to Acidification

Pocillopora and Acropora) from Rottnest Island. Claire Ross (UWA)

The University of Western Australia (UWA) have found that some corals are able to combat the effects of ocean acidification by controlling their own chemistry.

The world-first study is a breakthrough for marine science because the scientists have identified marine species that are resilient to ocean changes, which will help better understand how to protect coral reefs in the future.

Lead UWA author Dr Thomas DeCarlo said rising carbon dioxide (CO_2) levels in the atmosphere leads to ocean acidification. "Acidification hampers the ability of the coral to form skeletons and shells which are the building blocks of reefs," Dr DeCarlo said.

"In the past few decades, hundreds of experiments have shown that corals have a highly diverse response to ocean acidification depending on the species. However the reasons why some are more tolerant than others are not clearly understood."

"Our testing showed corals with the most resistance are tolerant because of the way they are able to regulate their calcium levels," Dr DeCarlo said. "This technique means we can identify species that are relatively resistant to ocean acidification."

"However we are also looking at the costs associated with resisting acidification, which may make acidification-resistant corals more vulnerable to other stressors."

Co-author UWA Professor Malcolm McCulloch said previous studies found that even the more hardy coral species lose their ability to adapt to ocean acidification when they bleach under extreme heat events as experienced in 2016.

"When a coral bleaches, it expels its 'powerhouse' - zooxanthellae symbionts - and loses the energy needed to keep its internal mechanisms running," he said. "The longer corals stay bleached, the less likely they are to recover."

Researchers from the same institution have previously examined the impact of the 2016 mass bleaching event on reefs in Western Australia.

They found significant bleaching occurred in the inshore Kimberley region, despite Kimberley corals being known as exceptionally stress resistant. They also found mild bleaching at Rottnest Island and that the Ningaloo Reef escaped bleaching.

The 2016 mass bleaching event is the most severe global bleaching event to ever be recorded.

New Studies Find High Seas Industrial Fishing is Heavily Subsidised and often not economic

Up to 54 per cent of the high seas fishing industry would be unprofitable without large government subsidies, according to a global research collaboration including The University of Western Australia.

Newly compiled satellite data and machine learning have revealed a far more accurate picture of fishing effort across the globe at the level of individual vessels. Researchers were able to track the individual behaviour, fishing activity and other characteristics of 3,620 high seas vessels in near-real time.

The high seas - marine waters beyond national jurisdiction - cover 64 per cent of the ocean's surface and are dominated by a small number of fishing countries. They identified fishing hotspots near Peru, Argentina, and Japan, which were dominated by Chinese, Taiwanese and South Korean squid fishing fleets. The Spanish were also key players in other areas. Overall, 20 countries are responsible for 60 million tonnes or 80 per cent of the global industrial fishing catch. Expansions of effort were most pronounced along the coasts and archipelagic waters of South-East Asia, Africa, South America and the South Asian subcontinent.

Combining this information with the global catch data, the team found that the global cost of fishing in the high seas ranged between $6.2 billion and $8 billion in 2014. Financial results from this activity ranged between a loss of $364 million and a profit of $1.4 billion.

and revealed that in many parts of the high seas, government subsidies are propping up fishing activity to levels far beyond what would otherwise be economically rational. Through targeted subsidy reforms, governments could save taxpayers money, rebuild fish stocks, and eventually lead to higher value, lower volume fisheries.

Professor Dirk Zeller from UWA's School of Biological Sciences and the Sea Around Us – Indian Ocean said that in many locations, the current level of fishing pressure is much higher than thought, is depleting fish stocks and is not economically rational.

"Some high sea fisheries, such as those exploited by China and Taiwan, are profitable only after assuming government subsidies and low labour costs," he said.

Heavily subsidised fleets from a small number of countries doubled the average distance they travelled from their home ports, the catch per vessel was only one-third of what they used to catch 65 years ago. They now operate in more than 90 per cent of the global ocean.

The paper also suggested individual fishing companies caught more than they report to fisheries agencies, making more money than they claim while still pushing governments for subsidies.

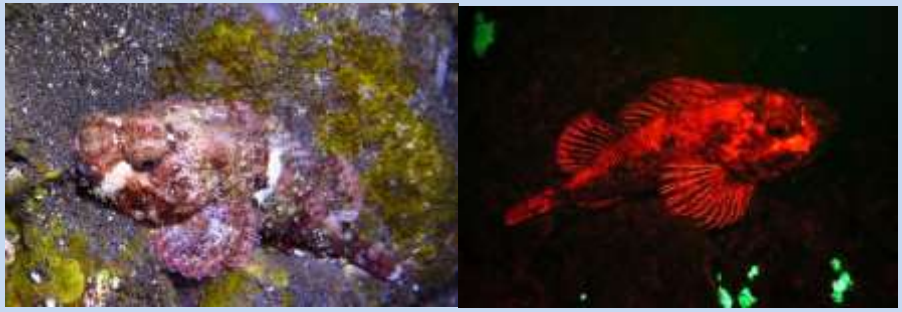
The study was further proof of how subsidies paid to industrial fishing fleets encouraged the irrational use of fisheries resources.

"We have to accept that for fisheries to continue to support humanity into the future, we are going to have to allow the oceans some space and time to recover from a century of unfettered industrial fishing," Professor Zeller said.

The secret eerie glow —biofluorescence

Source The Conversation By Maarten de Brauwer, Curtin University and Lynn Miner FireDiveGear.Com

More than half of the fish on coral reefs are tiny and well camouflaged, these are called "cryptic" species. Many of these species are "biofluorescent" — if you shine blue light on them they will reflect it back in a different colour.



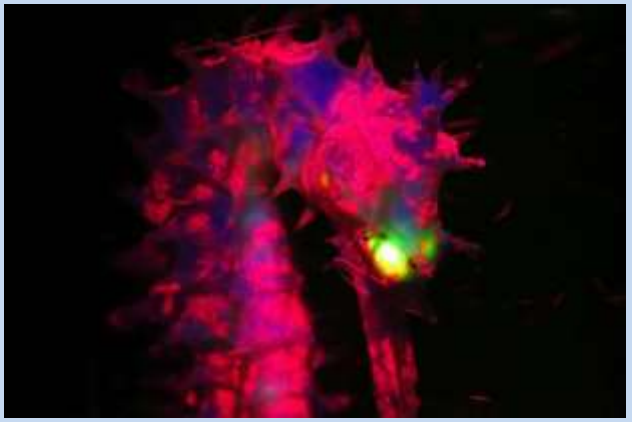
A scorionfish with and without blue light. *(Maarten De Brauwer)*

These small fishes live fast and die young, reproducing quickly and being eaten by bigger fish almost as quickly. We do know that some species are dwindling in number. The probability of a fish being biofluorescent is 70.9 times greater for cryptic species than for highly visible species.

Because cryptic fishes are so easy to miss, their total abundance is likely to be underestimated. Using biofluorescence researchers found twice as many pygmy seahorses, and three times the number of triplefins than with normal methods.

Many species particularly cryptic fish are classed as "data deficient" — a way of saying that we don't know enough to decide if they are endangered or not.

Biofluorescence is very different to bioluminescence, the chemical process by which animals such as deep-sea fish or fireflies produce their own light. In contrast, biofluorescent animals absorb light and reflect it as a different colour, so this process needs an external source of light.



Seahorses are biofluescent. ***(Maarten De Brauwer)***

The basic idea has been around for a while. The fluorescent effect was actually discovered in the 1830's by Irish physicist George Stokes. In the 1920's Charles Phillips did work on fishes and bioflouescence. Dr. Charles Mazel a noted marine biologist did much of the scientific work on determining which wavelength(s) of light cause the greatest spectral emission of sea creatures in the 1980's and 90's.

Underwater photographers are on to it too and you can buy UV and blue light torches. The difference is in the wavelength of light they use. There are things do that fluoresce under UV and don't fluoresce under blue, but the opposite is vastly more common. Marine creatures that do fluoresce do so much more dramatically under blue light. Blue light is also softer on the eyes of animals and other divers, UV can blind them.

In the ocean, biofluorescence can be observed by using a strong blue light source, combined with a diving mask fitted with a yellow filter.

You can spend up to $450.00 on one. Not only can you take weird shots with the right filters, you can also track hard to find marine life in the rocks and crevices.

Know Your Moray Eels

Source: WA Primary Industries

What is a moray eel? Despite their snake-like appearance, moray eels are actually fish. All moray eels have one long fin that extends from the head to the tail. Because it looks quite ferocious, the moray eel has long had a fearsome reputation. At least 15 different species live in north-western Australia.

What does it look like: A moray eel has a long, slender, snake-like body, combined with a large set of jaws. Most species have long, sharp canine teeth but some have low, nodular teeth. They are usually one to two metres long, though some species will reach up to three metres long and 30 centimetres in diameter. The colour varies from black to brownish-yellow with a pale underside.

Where do they live? These creatures live in holes in the reef. Moray eels are found in tropical and temperate waters throughout the world. They are very common in Rowley Shoals Marine Park and found in other marine parks in northern WA.

What they eat and how: They rarely venture far from the crevices in which they live and feed by concealing themselves in the reef and waiting for an unwary meal to swim by. The morays with long, canine teeth feed mainly on fish, and occasionally on octopuses and crustaceans. Other species with blunt, crushing teeth prey principally on crustaceans, especially crabs. Moray eels are able to tie their bodies into knots, to anchor themselves when tearing at food.

Behaviour: Individuals nearly always have their mouth open.The mouth is open to allow water to pass through the gills, enabling them to breathe.

Breeding: Courting moray eels open their mouths very wide, then wrap their bodies around each other for hours. They do not separate until the female has laid her eggs and the male has fertilised them. Once hatched, all eels go through a larval phase (known as a leptocephalus) as juveniles, in which they form part of the plankton.

How you can protect moray eels: Avoid accidentally bumping in to an eel. Spearing these animals is a sure way to have a very annoyed moray eel attached to your leg. Feeding eels is strongly

Western moray Gymnothorax woodwardi Howies Scuba world

Uniquely WA fish

Black spotted catshark

CSIRO

The Australian blackspotted catshark (*Aulohalaelurus labiosus*) is endemic to Western Australia in the eastern Indian Ocean between latitudes 28° S and 36° S. It can grow up to 67 cm.

Striped stingaree *Trygonoptera ovalis*

Trygonoptera ovalis. Source: Ben Jones.

A small to medium stingaree from Western Australia from Eucla on the Nullabor to the Abrolhos Islands. It is common in shallow water in depths to 43 m. This species typically occurs over rocky reef and is rarely caught by commercial fisheries.

Western moray

Gymnothorax woodwardi, is a moray eel found in coral reefs in the western Indian Ocean, around Australia. It was first named by McCulloch in 1912.

It is often mistaken with the green moray, but is relatively common around the Swan River where it is regularly seen by divers. Ammo Wharf or the Swan River is a classic spot to find them.

Our Goal

To educate, inform, have fun and share our enjoyment of the marine world with likeminded people.

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