

MARINE *Life*

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Our Goal

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

The Crew

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Cover photo, Fiddler Ray, Port Phillip Bay, Victoria by Phil Watson



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From despair to repair: coral reefs can be saved



Reef biologists over a certain age are haunted by memories of what places like Caribbean reefs once looked like.

In 1972, marine biologist Sylvia Earle wrote that Caribbean coral reefs are, "almost devoid of conspicuous plants." Today reefs are

overgrown by seaweed. Most Caribbean coral reefs will disappear in 2 or 3 decades if we don't restore the grazers that defend the corals from seaweed. A new report shows a more than a 50 percent decline in living corals throughout the Caribbean over the past half century.

While it is true that climate change poses an enormous risk for the future because of coral bleaching and more acid oceans, the fact is reefs protected from overfishing and excessive coastal development and pollution are more resilient to these stresses. "Even if we could somehow make climate change disappear tomorrow, these reefs would continue their decline, said Jeremy Jackson. Many people say that climate change has already doomed coral reefs but the report shows that loss of parrotfishes and other grazers has been far more important than climate change for Caribbean reef destruction so far.

A new report confirms that the healthiest Caribbean coral reefs have vigorous populations of grazing parrotfish. Live coral cover is more than double or triple the average coral cover. All of these places prevent the fishing of parrotfish. A brief breakdown in these protections resulted in an immediate decline in the health of Bonaire's reefs, which triggered a quick restitution of protections.

Some countries are already taking new positive action. Barbuda is moving to ban all catches of parrotfish and grazing sea urchins while also planning to set aside one third of their coastal waters as marine reserves.

MPAs help replenish fish stocks

James Cook University professors have said fish larvae showed they used their senses to find their way home. Using smell and hearing 20 per cent of these actively swimming fish larvae can return to their starting point compared to less than two per cent for passively drifting coral larvae. Many more fish larvae can end up on other reefs nearby and replenish fish stocks in fished areas.

"This means that the high larvae numbers from marine protected areas help resupply fish to fished reefs outside marine protected areas."

Professor Wolanski explained that after hatching, fish larvae cannot swim and are dispersed by ocean currents. However, when the larvae have grown a dorsal bone, they can swim. They swim horizontally using the smell cue towards home, that is, the reef where they were spawned. The fish larvae can also hear. If lost at sea and they come within hearing distance – one to two kilometres – of another reef, they can swim to it. This is how MPAs help replenish fish in depleted areas.

A large number of coral reef fish larvae from an MPA are dispersed away by oceanic currents, but these larvae can recruit in large numbers to reefs outside of the MPAs. MPAs help replenish fish stocks in fished areas."



Cities on the sea



A US organisation is hoping to create cities which float on the ocean

The Seasteading Institute says it hopes the floating microcountries producing their own food.

Communication director Joe Quirk says "When you consider that nearly half the world's surface is a blank slate, unclaimed by existing governments, you see the potential in creating a thousand start-up governments in the sea," he said.

"...we don't think 193 national governments represent the range of ideas that 7 billion creative people have produced.

The first city, made up of modular platforms, could be built by 2020 and house about 225 people. Mr Quirk says they are looking for a nation to host the city in its shallow territorial waters and provide it with substantial political autonomy [*what a great way for a tax break, or to be a haven for the mafia- Ed*].

"...we'll set an example and show people that seasteads can be of benefit to the world," he said.

CSIRO cuts jobs



CSIRO announced plans to cut up to 500 jobs, after having its budget slashed by \$115 million over four years. The CSIRO has already suffered many budget cutbacks over the years.

The CSIRO Staff Association said scientists will account

for 28 of 31 job cuts due to happen now. The cut researchers cover areas such as ocean climate processes and climate modelling, as well as biodiversity. Most of the jobs will be lost in Tasmania and Victoria.

About 18 research positions in marine and atmospheric research will be cut from Hobart, while eight positions will be cut at CSIRO's Aspendale Laboratory in Melbourne.

The pace of job losses is expected to accelerate. One-off funding of \$32 million, to finance redundancies, must be used by the end of the month.

Other programs likely to get cut cover geothermal energy, liquid fuels, carbon capture and storage, and climate change. CSIRO's research on coal seam gas is likely to increase.

Roger Dargaville, of the University of Melbourne speculates that the changes mean the CSIRO have a deliberate strategy of investing in programs that are likely to impress the government and head off any more future cuts. "It may just be holding up a mirror to the federal government's apparent reluctance to engage on climate change"

Tracking Antarctic & Southern Ocean hotspots



Satellite tracking of six seal and seabird species in the East Antarctic sector of the Southern Ocean has identified six hotspots of important marine habitat.

Two decades of satellite tracking ('telemetry') data had been collected by tagged Adélie and emperor penguins, light-mantled albatross, Antarctic fur seals, southern elephant seals and Weddell seals.

The preferred habitat of each species was identified by applying statistical modelling methods to the observed tracks. The results were consistent with previous studies which have shown, for example, that both Adélie and emperor penguins prefer habitat close to their breeding colonies during the chick-rearing period. Male and female southern elephant seals, in contrast, disperse widely from their colonies after breeding and concentrate on shallow parts of the continental shelf and areas of winter food abundance.

"Areas of overlap were all located in the southern part of the study region, generally over the Antarctic shelf and waters immediately to its north, excluding deep, open oceanic areas," Dr Raymond said.

"Female Weddell seals and to a lesser extent emperor penguins were most strongly associated with near-coast areas. Light-mantled albatrosses preferred offshore areas, closer to their subantarctic breeding islands. The remaining species showed more uniform distributions."

Large changes ahead for Antarctic marine ecosystems



An international group of Southern Ocean experts has found that changes in Antarctic and Southern Ocean habitats will change the structure and function of marine food webs.

While the ultimate consequences of climate-related changes on Antarctic marine ecosystems are not well understood, they are expected to cause shifts in species' ranges and may result in reduced biodiversity and novel changes in the structure and function of marine food webs.

"For Antarctic krill and finfish, which can move large distances, the breadth of their range will depend on how well

they tolerate warming oceans and changes to productivity." The Antarctic Division's Dr Constable said.

The study also found that ocean acidification will affect krill reproduction and the ability of some marine organisms to produce shells and other hard, protective structures. While marine mammals and birds may need to find alternative locations for food, resulting in longer or more complex foraging trips for those bound to breeding colonies.

WA New

If at first you don't succeed, just spend more



The WA Government wants to bait almost 1,000 sharks over the next three years.

The Government has applied for Commonwealth approval to set up 72 baited drum lines until 2017. Nearly 900 tiger sharks and up to 25 great whites are expected to be caught over the next three years.

The policy was enacted after a spate of fatal shark attacks in WA, attributed mostly to great whites. A recent three-month effort caught more than 170 sharks on baited drum lines located off five beaches in Perth and two in the South West. None were great white sharks.

Opposition's fisheries spokesman, Dave Kelly, said it was hard to fathom why the Government was proceeding with a policy expected to mainly catch tiger sharks. "From a public safety point of view, this program is utterly pointless". The policy has been highly controversial and you may well ask, and one of our readers has, why there is so much media focus on it instead of on the long-standing equivalent programs in NSW and Qld?

WA culls are more topical for reasons which it could be argued are not very consistent. However, the current policy IS a significant extension of the culling program in Australia. Interestingly, it is at odds with the way SA has dealt with its own not infrequent white pointer attacks.

This very dramatic response has come about because there was a very intense reaction to a series of frequent and unexplainable tragedies.

White pointer numbers may well have been slowly growing, perhaps as whale numbers grow according to one theory, but population increases have been slow and this doesn't explain the increase in attacks on humans.

Simply starting a culling program also doesn't immediately make beaches safe, and in fact the program to date has actually had no impact on the target species numbers. That is surprising. If white

pointers were patrolling WA beaches routinely in numbers, you might have expected a few to have been caught by now. The interesting question is why not? If they are inshore it seems to be in response to an unknown intermittent stimulus.

Culling hasn't REALLY done anything to lessen the risk of attack in WA, it's just falsely made some of us feel safer. Isn't it right to call that a failed approach? Wouldn't it be better to expend our effort on answering a bigger question, 'Why were there so many attacks in recent years?'

p.s. From 2008-2012, 54 great white sharks have been culled by the programs in NSW and Queensland. The nets also inadvertently killed 13 endangered grey nurse sharks and kills dolphins, turtles, whales and dugongs. In NSW, 61% of the marine life killed in the nets was "non-target" species. In 1937, approximately 1000 sharks were taken off Sydney beaches in the first year of operations. In 2001/02, 69 sharks were killed.

Floating LNG

Construction of Shell's Prelude FLNG facility is in progress.

Once complete it will be deployed off the northwest coast of Western Australia to extract and process gas from the Prelude and Concerto gas fields.

Shell's floating LNG platform Prelude is bigger than the Empire State Building and designed to remain at sea off Australia's west coast for 25 years.



Prelude has decks 488 metres long and 74 metres wide. The ship weighs more than 600,000 tonnes fully ballasted - roughly six times as much as the largest aircraft carrier. Some 260,000 tonnes of that weight will consist of steel - around five times more than was used to build the Sydney Harbour Bridge.

Prelude will be located in the Browse Basin, approximately 475km north-northeast of Broome. The FLNG design includes a number of key safety features and is on par with modern offshore oil and gas facilities.

Did a monster shark eat an adult Great White?



In late 2003 the CSIRO tagged a 3m white shark off south-west Western Australia. The data tag later behaved as if the 3M shark had been eaten by something way bigger!

The tag that collects data on depth, water temperature and light levels. The tag was programmed to release from the shark on a pre-programmed date, float to the surface and transmit the data collected via satellite.

The tag surfaced approximately two weeks earlier than programmed. It washed ashore near Esperance, WA. There was a period of approximately three weeks just before the tag surfaced where the temperature recorded was higher than the surrounding sea, but where the tag continued to 'dive' in a pattern consistent with a white shark. During this time, the tag failed to record light. Data before and after suggest the tag was functioning normally. The temperature recorded for these three weeks was consistent with that of the core body temperature of a white shark but too low for something like a killer whale.

At one point the tagged shark dived to a depth of 570 m – this is not unusual for white sharks – it is normal behaviour. This dive took place about one week prior to the tag recording the higher temperatures (not immediately before as some have reported) and the two events are not related.

All evidence suggests that the tag, not the shark, had been eaten by another white shark.

WA/NT News

New giant clam species discovered



A new species of giant clam has been discovered in north Australian waters

Charles Darwin University researcher Shane Penny says it took him some time to find the species among a population of fluted giant clam, at a site near Ningaloo Reef in Western Australia.

Giant clams are a high value commodity in the aquarium trade, and have been the target of illegal fishing in recent years, as well as legal farming ventures.

Mr Penny says the giant clam's current conservation status, listed as lower risk/conservation dependant by the IUCN, may need to be upgraded following the discovery.

"If anyone had done surveys out at Ningaloo, or anywhere in general, they would have just counted this as the other species it looks similar to," he said. "This would have overinflated the actual abundance of that species.

"So now that we find we've got a new species amongst it, it's not only increased the number of species, but that reduces the abundance of others.

"This may or may not impact on whether we think those populations are critically low or not."

Seagrass regeneration trial off Adelaide



About 2,000 sandbags are being dropped into waters off Grange in a project aimed at boosting Adelaide's seagrass.

The metropolitan coast is exposed with high levels of water and sand movement. Traditional methods of transplanting seagrass seedlings don't work because they simply get washed away.

The biodegradable hessian sandbags allow more seagrass seeds to take root.

The sandbags are being dropped across two areas of the seabed and the divers will check in six months to see whether there is new growth.

In areas where the hessian bags have been spread previously, thriving seagrass has been found more than five years later.

It is estimated more than 5,200 hectares of seagrass have been lost along the Adelaide coast in the past half century.



Fishermen push to scrap 12 no-fishing zones



From October, 19 new marine parks will take effect to protect fish stocks and special underwater environments. Within those parks there will be more than 80 small sanctuary zones where fishing will not be allowed.

Liberals have introduced legislation to downgrade restrictions in 12 of those 80 zones to allow fishing. The zones are around Kangaroo Island, Eyre Peninsula and the top of Gulf St Vincent.

Commercial and recreational fishers yesterday lobbied new Regional Development Minister Geoff Brock to support the Bill. However, Mr Brock – the independent MP who helped Labor form government – will not take a position until he receives a further briefing. Trade Minister Martin Hamilton-Smith, the other independent MP in the Government, will also attend. Their support in the Lower House is needed for the Bill to pass.

Ms Lensink, a Liberal who sits in the Upper House, said “We don’t believe that the marine park zoning is based on science because they (the Government) never did a threat assessment,” she said.

Environment Minister Ian Hunter said the final marine park boundaries were decided after 10 years of consultation involving 35,000 people. The consultation resulted in more than 50 changes, which reduced the impact on the commercial fishing industry from 2.1 to 1.67 per cent of its annual gross value of production. He told Parliament, “This Government remains committed to ensuring these (sanctuary) areas are protected.”

Call for relocation of Port Bonython Fuels away from Point Lowly

By Dan Monceaux (Extract)



The announcement of the imminent construction of the Port Bonython Fuels project, a \$110 million diesel storage and distribution hub on the Point Lowly peninsula, caught environmentalists and Whyalla locals by surprise yesterday. The development

approval decision which was made in 2009 was premature, and was granted based on inadequate information. A more suitable location is available nearby, 20 kilometres closer to the Lincoln Highway, which could mitigate many of the project's adverse social, economic and environmental impacts.

The full development plan at the time of approval was for a multi-stage development including a tank farm and diesel distillation facility. It was designed to be capable of delivering a billion litres of fuel per year, stored in multiple tanks up to 21 metres high and 60 metres in diameter. The official forecast is for up to 50 tanker trucks per day once fully established and they'll all be sharing the single access road to Point Lowly with full-time residents, shack owners, fishermen, eco-tourists and Grey Nomads.

The traffic burden alone will be a huge turnoff to visitors, let alone the visual, light, sound and odour pollution. The net result is bound to damage to the location's reputation as peaceful escape; a place renowned for its spectacular views of the Flinders Ranges, visiting whales and dolphins and the world's only Giant Australian Cuttlefish mass breeding aggregation."

Other industrial development proposals promising to increase shipping activity in Spencer Gulf were required to secure Federal environmental approval, while the Port Bonython Fuels project was not.

My concerns relate to the possible impacts upon coastal and marine life in the event of an oil spill during unloading. His fears are not hypothetical either, as the Port Bonython wharf was the site of the state's worst recorded oil spill at sea in 1992.

Official investigation and news reports of the Port Bonython spill suggest that adjacent industry was poorly equipped to respond. Hundreds of seabirds were oiled and killed, toxic dispersants were deployed from the air and water and subsequently, abnormalities were detected in crabs and snapper caught by local fishermen.

The project's economic cost includes hobbling of the development of Stony and Black Point areas for low impact marine eco-tourism. The star attraction is the Giant Australian Cuttlefish aggregation.

I understand the need for such a facility if the state intends to better serve its regional primary industries. What I can't accept is why rational calls for the facility to be relocated away from Point Lowly have been ignored. Relocation closer to the Lincoln Highway could potentially improve the efficiency of access for trucks, but would require the construction of a new 20 kilometre long hydrocarbons pipeline connecting the site with Port Bonython.

Save Point Lowly and the peninsula's natural heritage from these unnecessary sacrifices.



Qld News

Sediments damaging reef

Sediment being washed into the ocean from rivers is continuing to damage the Great Barrier Reef and is having a more widespread impact than scientists first thought.



The Australian Institute of Marine Science (AIMS) has led the study of 10 years worth of satellite data. The study focused on run-off from the Burdekin River.



The study shows that large river flood events during the wet season are washing sediment into the ocean, which is having a significant impact on water quality around the reef.

The sediment reaches far off the coast and lasts several months. Sediment is one of the biggest pressures on the

health of inshore reefs.

It clouds the water and blocks sunlight from reaching the photosynthetic algae that gives coral its vibrant colours. The algae depends on the sun to survive.

It can also kill or damage sea grasses, which are important food for mammals and fish because they also need the sun to survive.

The study showed that water clarity was affected not only in the inshore area, but actually at a lower level it was visible quite a way off shore.

Modelling studies show the amount of sediment in the water has increased significantly since human settlement and the beginning of agricultural activities. Other factors blamed include wastewater and stormwater run-off and more industry and other coastal development.

The new research into the impact of river run-off has led to renewed calls for better land management practices.

Work on reducing the amount of sediment entering the ocean has already begun.



Decade of success for Great Barrier Reef MPA

With the tenth anniversary of the rezoning of the Great Barrier Reef Marine Park, prominent marine scientists from around the world have gathered in Canberra to discuss its track record



“At the time, the rezoning of the Great Barrier Reef Marine Park was the largest marine conservation measure in the world,” says Professor Garry Russ from the ARC Centre of Excellence for Coral Reef Studies (Coral CoE). “The Reef went from being five percent protected to about 30 percent. So now, a third of it is green, or no-take, zones.” And with no fishing allowed in the green zones, the fish and sharks in these reserves are bigger and more plentiful than they are in the fished areas.

“Remarkably, almost every habitat feature and bioregion met its 20 percent conservation target,” Professor Hugh Possingham says. “And furthermore this was all achieved whilst minimising impacts on other users.”

However, this achievement was not met without some controversy. Prior to 2004, protected areas were a lot further away from the coast.

But with the rezoning, protected areas were brought in closer to shore and to cities such as Townsville, Cairns, Mackay and Rockhampton.

“Though the objective of the rezoning was to protect biodiversity, the political issue very rapidly became focused on fishing,” says Russ.

Scientists were challenged for many years to prove that marine reserves were benefitting fishing areas through connectivity. But they weren’t able to do so until a study published in 2012 linked parent fish in the green zones to baby fish in the fishing areas through DNA tracking.

“About 80 percent of the babies of big coral trout from these green zones are being dispersed via ocean currents to settle in the fished areas,” explains Russ. “So marine reserves don’t lock up fish resources. In fact, it is a pure bonus through conserving biodiversity that we see reserves exporting fish recruits to fishing areas.”

In the Keppel Islands, ocean currents on average disperse coral trout larvae about eight to nine kilometres (kms) away from their parents.

“Currents can carry larvae as little as one km away,” says Russ. “But the maximum distance recorded so far is an astounding 250 kms.”

“From these figures, we can see that the reserves are likely connecting to each other, which is great for the conservation objectives and great for the fisheries too.”

But, Russ warns, even with the successes of marine reserves, it doesn’t mean we can get too comfortable.

“The Great Barrier Reef has been hit by a lot of major environmental disturbances, such as cyclones, crown-of-thorns outbreaks and bleaching events,” he explains. “Live coral cover has declined by 50 percent in the past 27 years, and we see both no-take zones and fishing zones hit equally as hard.”

“What this shows is that protected areas are not necessarily protected from everything. But how they recover will depend on the number of other stressors they have to contend with.”

A management plan for an extension of Australia’s current marine reserves network is currently under review by the Australian Government.

Feared extinction of local Hunter shore birds



The local extinction of migratory shore birds in the Hunter River estuary is forecast within the next two decades as numbers decline rapidly.

The Hunter Bird Observers Club says figures for 2013 showed no improvement, with less than a third of the birds coming to the region when compared to 15 years ago.

Member Chris Herbert says that is largely due to habitat destruction locally and at the bird's Northern Hemisphere refuel areas near China and Korea.

He says three types of the 20-odd species that come to the Hunter are already gone.

"Projecting the decline of these birds into the future from the data that we have in the future, which is very detailed data, there'll be virtually an insignificant number of migratory shore birds in the estuary during the next 10 to 20 years," he said.

"It's that serious a decline and so steep."

The club says the loss of migratory shore birds in the estuary is part of an international problem that must be dealt with.

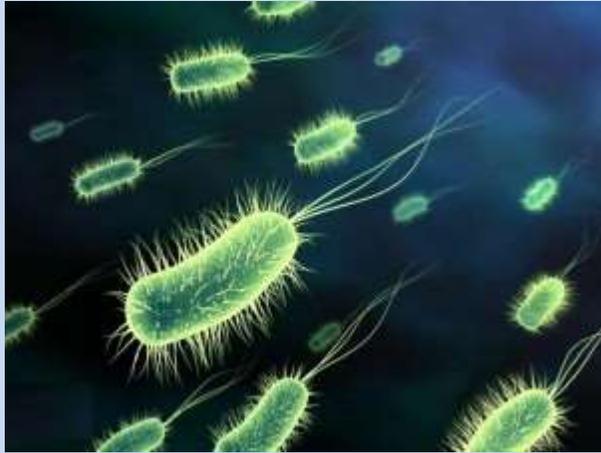
Mr Herbert says the development and filling of tidal flats in the Yellow Sea near China and Korea for things such as fish farms is having a drastic effect on bird numbers as their feeding habitats are destroyed.

"We're monitoring the decline of a whole group of bird species here and we know really what's going on and probably now after all the modifications we've done locally," he said.

"It's now probably up to the Chinese and Koreans doing something to stop the development in prime areas where these birds feed in the Yellow Sea on their way north to breed."



Seafloor is a hotbed of life



The seafloor is home to over 1/3 of the bacteria on the planet

Until recently it was unclear if this huge microbial biosphere was still alive and dividing.

By drilling deep into the sea floor and taking samples, it can be proven that the seafloor contains a variety of

microbial lifeforms.

Lead researcher William Orsi said: "This is the largest microbial biosphere on Earth, composed of cells living deep beneath the surface. The deep biosphere is active and due to its sheer size likely plays an important role in global elemental cycles over geological timescales." "It's a really difficult environment to study, so understanding how microbes survive there has been a puzzle" he said, "but we have discovered that they ramp-up some coping mechanisms which have helped them adapt to this stressful environment, where they exist under high pressure and are starved of nutrients."



They can tell us how biology responds to climate changes over geological timescales. Looking into the past can help us predict the future effects of climate change on marine life."

Acropora Coral



Acropora is a genus of small stony coral of over 149 species known sometimes as table coral, elkhorn or staghorn coral. *Acropora* is most common in shallow reef environments with bright light and moderate to high water motion. *Acropora* is one of the

major reef building corals. Depending on the species and location, *Acropora* may grow as plates or slender or broad branches. As they have a dense structure they are often used as a refuge by small fish.

Like other corals, *Acropora* corals are colonies of individuals known as polyps, which are about 2 mm across and share tissue including nerves. The polyps extend to capture plankton and dissolved organic matter from the water and for a long time we thought this was the only way they made food. Then we discovered that they have an algae living in their tissue. It has a safe home protected by the corals stinging polyps, while they in turn process light and supply the coral community with most of its food. When it gets too hot, too acidic, too polluted, the water too cloudy, and the coral is stressed it will eject its zooanthellae algae and then die, causing an effect we call "coral bleaching".

Most *Acropora* species are brown or green, but a few are brightly colored. Given the right conditions, many *Acropora* species grow quickly, and individual colonies can exceed a metre across in the wild.

Pest in Paradise - *Drupella* Snails

By Mike Jacques



The *Drupella* snail is about as innocuous as you can get, but from little things, big populations grow. *Drupella* snails breed faster than spam mail.

This wouldn't be such an issue except that they like to gnaw on coral polyps.

Between the mid 1980s and early 1990s, unusual environmental

conditions caused high densities of *Drupella cornus* resulting in massive coral damage along at least 100 km of Ningaloo Reef in W.A., with coral mortality approaching 100% in some areas. Outbreaks of *Drupella* snails have also been reported in the Izu Islands in southern Japan, and in Eliat and the Gulf of Aqaba in the northern Red Sea.

At the time, the detrimental effects of *Drupella* snails was compared to those of the notorious crown of thorns starfish. During population explosions there can be up to 175 individuals per square metre of reef. It doesn't matter that you are small if you have strength of numbers.

The field survey of *D. cornus* in the Gulf of Aqaba showed that number per square area was higher in industrial areas when compared with reserve areas. Data from a study of 8 Kenyan coral-reef lagoons showed that *Drupella cornus* populations have increased the greatest in heavily fished reefs and a transition reef (converted to a park in about 1990) but less pronounced in the unfished parks and a reserve (restricted fishing). The numbers of snails were larger where their predators were few rather than where their coral food was common.

Drupella cornus can produce more than 150 thousand plankton one month after spawning and which swim to their coral prey.



However, unlike the crown of thorns starfish, *Drupella* snails are not immune to the stinging cells - nematocysts - of live coral. They avoid contact with live coral tissue, preferring to perch on dead coral and feed on the live tissue by extending a proboscis. This means that corals that have been previously damaged by other predators, severe storms or climate change are more vulnerable to *Drupella* snails.

Drupella particularly likes to feed on branching corals belonging to the family Acroporidae. *Acropora* corals provide the best combination of food and shelter. Stylophora was also popular, but they didn't like massive corals such as Porites. *Drupella* snails can thus cause a reef to change its species composition even if it doesn't kill it, displacing lots of other animals that need a special type of coral cover.

Warm water makes them hungry and grazing rates increased by five times at 30°C compared with 18°C. The snails feed by rasping away the external coral tissue using the radula (a rough 'tongue'), then feeding on the inside of the polyp using the proboscis. They leave only the dead white skeleton behind.

Scientists believe that predation by *Drupella* is not as big a threat to corals as over-fishing, habitat destruction, and coastal run-off, but they lie in wait to take advantage of a sick coral reef that isn't at its best.

Drupella snails are the vultures of the tropical reef. If our reefs aren't in great shape the corals don't have the strength to beat them off.

Natures Real Survivors

Genesis – Pre-Cambrian Blue-green algae and their surviving structures

We might be fascinated by a movie about extinct dinosaurs, but many of our prehistoric animals are still with us. Some survive merely as tiny remnant populations, while others survive as copies of ancient body forms.



In the beginning there was light... but not much else to write home about. Billions of years ago the atmosphere was unbreathable (1% oxygen) and shallow saline seas covered many areas with a milky soup of organic slush. High levels of dissolved iron gave the water a greenish tinge. The moon was closer than it is today, causing huge tides. In that soupy mix God, Allah, Shiva, Zeus, chance, physics or whomever you may wish to use to describe these things, sparked off something. Chains of molecules evolved into complex compositions that became the first simple living things able to process sunlight into food. Life burst forth from this liquid soup.

One of the earliest forms of life was cyanobacteria, also known as toxic blue-green algae. You can still find a film of this algae on rocks in intertidal pools. It is rarely noticed except when we add pollution to a warm, shallow waterway. That creates conditions a bit like the early

history of earth and it blooms into a 'toxic tide' that taints drinking water and irritates the skin of swimmers.

Algal Reefs

Three and a half billion years ago it was one of the dominant lifeforms on the planet. This simple plant was soon creating complex structures that would rival the Great Barrier Reef in grandeur.

The algae trapped sediments on their sticky surfaces and excreted limestone. This acted as a 'glue' binding more sediments together around these clumps of algae called stromatolites. It's a slow process as a one metre high clump might take a thousand years to grow. Three billion organisms can live on this one metre tall algal clump. Over the millennia they became prominent structures in the fossil record. There was so much algae that it converted the huge amounts of carbon dioxide in the atmosphere into oxygen.

If you visit Shark Bay you can see the oxygen fizzing out of the structures. This combined with the iron sludge in the ancient seas and caused iron oxide to settle. The seas began to clear. In places like the Pilbara of W.A. this process created the immense bands of iron deposits that we mine today. About 1.8 billion years ago the iron became completely oxidised and the excess oxygen now escaped into the atmosphere.



Stromatolites sowed the seeds of their own decline. Oxygen became fuel for the evolution of more complex animals like snails and worms that eventually outcompeted cyanobacteria and ate away at the giant structures. After a three billion year reign they disappeared from the fossil record about 500 million years ago. This type of microbe can still



be found in our oceans today, but now they can't form these giant stromatolite 'reefs'.

In the modern era geologists started to unearth fossil stromatolites and quickly put them into the 'extinct' category, but that underestimated the resilience of this simple but amazing collection of organisms.

Modern Stromatolites of Shark Bay

In 1956 stromatolites were rediscovered in the Hamelin Pool, a small area in Shark Bay, Western Australia. Here the topography and odd tides have created an isolated pocket of water so hot and saline that stromatolites can form and survive free from competition. Although the stromatolites are only a few thousand years old and a bit different biologically, one species of microbe that was found on a stromatolite is so unchanged it has been traced to a fossil 1.5 billion years old. It is thought to be the oldest known surviving species on earth.

Since then salt water stromatolites, mostly pretty small, have been found in other places. The really big ones exist only in Western Australia and two locations in the Bahamas. Some freshwater stromatolites have been found in Brazil, Mexico, Turkey and Canada.

You can visit one of the world's great natural wonders at Shark Bay, a 10 hour drive north of Perth. Make a week of it and do some of the local diving, kayaking or snorkelling. The other attractions aren't a billion years old, but there are dolphin encounters and historic wrecks, turtles, mantas, dugongs and lots of other 'younger' stuff you would predictably find in a World Heritage Area.

Thrombolites of Lake Clifton



Stromatolites form in annual layers like tree rings in salty water, but they aren't much different from thrombolites that form slightly differently in brackish water. Thrombolites don't settle evenly but clot in uneven lumpy concretions. Once again this ancient lifeform can still be found in Australia.

Lake Clifton in the Yalgorup National Park, south of Mandurah is well known for its thrombolites. They grow at an average of 1mm a year. The thrombolites are dominant on the east side of the lake, because their calcium source is in the fresh groundwater which passes through the sand dunes on this side. These peculiar structures are most easily seen in March and April. There's an observation walkway that allows you to get up close without causing damage. Microbial mounds, which are the remains of thrombolites, can be seen at nearby Lake Preston. Thrombolites are the most common form of microbialites (microbial structures) and are formed by a variety of micro-organisms. Lake Clifton is one of the few places in the State where living thrombolites survive and it is only one of two places in the world where they grow in brackish water.

NT Heritage Feature

Blockade Runners - The "Florence D" and "Don Isidro"

by Mike Jacques



In early 1942 the Japanese were rampaging across the Pacific unchecked. Only in the Philippines was a cut-off and starving garrison still holding out, blocking the entrance to Manila Bay.

Since early January strenuous attempts had been made to get food and medical supplies to the men on Bataan and Corregidor. General MacArthur, and later General Wainwright, demanded that the Japanese blockade be broken, and that drastic measures be taken to relieve the Philippine garrison.

The giant fleet that was meant to deal with this situation was lying on the bottom of Pearl Harbour. That which could no longer be achieved with force, now had to be done by stealth.

A blockade-running program was organized. Surface vessels, combat aircraft, and submarines were dispatched to the Philippines in the hope that some would get through. No expense was too high, no effort too great. The assignment of a ship on such a mission was regarded by most as "tantamount to its permanent loss".

Washington dispatched two officers to Indonesia with "practically unlimited funds", one million dollars to reward those who broke through the blockade. US Army Headquarters in Australia prepared an ambitious schedule for 3,000,000 rations--a sixty-day supply for 50,000 men--and a large quantity of ammunition.

By the middle of January 1942, General MacArthur's men had been on half rations for some time and MacArthur pleaded again that "the food

situation here is becoming serious". He argued that his needs were not large and they could easily be met by small or medium-sized vessels.

There were few vessels in Australia or Java fast enough to run the blockade, or large enough to carry sufficient cargo. If a ship was chartered, it was hard to find the crew willing to embark, no matter how high the reward. Altogether, about ten old Philippine and Chinese coastal vessels were procured in Australia. In an effort to protect these vessels from hostile attack, they were dressed up like neutral or Axis ships and provided with guns, dummy stacks, bogus flags, and "all imaginable types of deceit."



By 22 January, the *Don Isidro*, a small Philippine freighter, had been chartered. The MS *Don Isidro* was originally a passenger ship built in Kiel, Germany in 1939. Now she was being loaded with rations and ammunition at Brisbane. It would sail directly for

Corregidor. Within two weeks the number of ships en route or scheduled to sail for the Philippines had grown to five. On 4 February, the *Don Isidro* left Fremantle for Java to take on ammunition.

There she was joined by the "Florence D", a Philippine freighter under U.S. naval control, that had arrived recently and was at anchor up the coast at Batavia. Built in the United States in 1919 and originally named *Lake Farmingdale*, the 2,638 gross ton *Florence D* was now used by the US Navy to transport supplies. To get the ship, Colonel Robenson had had to offer the Filipino crew handsome bonuses ranging from more than \$10,000 for the master to lesser amounts for other ranks, and life insurance in values of \$50 to \$5,000



Florence D was so anonymous that no one kept a picture of her, ideal for blockade running. This is her sister ship.

The ships were loaded with food and munitions, as well as some personal gifts. General Wainwright was Robenson's friend and notorious for his love of beer. As a gift Colonel Robenson bought a case which he entrusted to the master of "Florence D" for delivery.

The ships then left Soerabaja separately on 12 February and 13 February.

It wasn't a moment too soon. Following the departure of the *Florence D* and *Don Isidro*, enemy air raids against Java's ports increased in intensity.

They were to pass through Dampier Strait, on the North West Coast of New Guinea, then swing north toward the Philippines for Gingoog Bay on Mindanao.

The ships chugged along alone trying not to attract too much attention as they followed their assigned routes south of Java for 150 miles before turning east to transit the Timor Sea.

On 17th February, they sighted a destroyer escorting a merchant ship about five miles away. The next day, an enemy bomber unsuccessfully bombed "Don Isidro" twice. The "Don Isidro" decided to change course and head for the port of Darwin and it seems that the "Florence D" decided to follow suit.

About 25 miles off North Bathurst Island NT the "Don Isidro" ran into trouble again. It was 19th February and Admiral Nagumo's carrier-launched attack planes were striking at Darwin Harbour. A group of the attackers sighted the ship and peeled off. Seven fighter planes machine gunned "Don Isidro" savagely, destroying all the life boats and holing the ship. At 1.30 p.m., a bomber was sighted and dropped two bombs that missed. But moments afterwards, nine or more dive bombers and

fighter planes attacked and set her alight. With engines out of action, she drifted ashore and burned out. The crew escaped.

The "Florence D" heard a radio SOS and headed for the "Don Isidro". As they were approaching Melville Island, an Allied seaplane appeared and flew cover. It must have seemed like their troubles were nearly over. The Catalina, under command of Lt Tom Moorer USN, had left Darwin early that Thursday morning for a patrol towards Ambon. He was actually looking into reports of a carrier invasion force when he spotted the merchant ship.

A flight of Japanese aircraft had also noted the small ship and seaplane, and some aircraft peeled off to deal with them.

As the American seaplane was checking out the small ship he was suddenly attacked from above by a small group of fighters. His aircraft quickly caught fire and the pilot ditched the aircraft immediately. The crew got out and paddled away in a life raft.

The *Florence D* came to their rescue, but her position had been reported. Another force was sent from the Japanese carriers



to sink the small ship. The Florence D was attacked again as she rounded Bathurst Island.



She suffered a direct hit to the forward cargo hold, packed with hundreds of thousands of rounds of ammunition. Her bow exploded dramatically and she sank immediately. Captain Carmelo Manzano was injured and 3 crew were killed along with

one of the Catalina's crew. The survivors were later rescued by *HMAS Warrnambool*. Even during this rescue they were again attacked by Japanese aircraft, but suffered no casualties.

The wreck of the Don Isidro rests in shallow water off Bathurst Island; the wreck of the Catalina is yet to be located.

Several unsuccessful attempts were made to find the "Florence D" and for decades she was the "Holy Grail" of Darwin wreck hunters. A bit of detective work, a tip from a fisherman, and hard searching with a side scan sonar picked up an anomaly in 12-20M depth, on a sandbank close to Melville Island. On a dive in pitch black conditions, they were able to identify iron sheeting with rivets.



NT Heritage Branch then led an expedition in March 2009 to investigate the site. A four person dive team investigated the wreck for three days, fitting within a tight window of tides and weather.

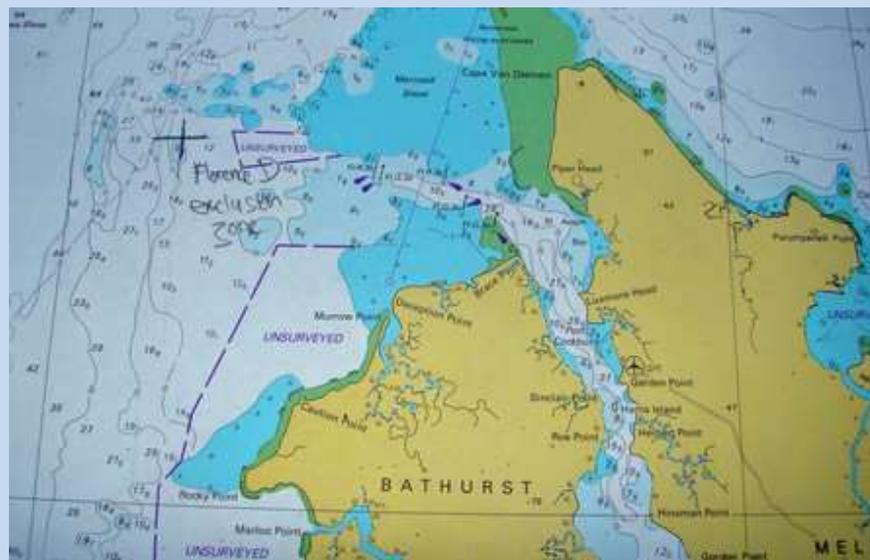
Initially visibility was at 0.5 metre, but gradually improved to approximately three metres. The general dimensions of the wreck matched that of *Florence D*. Unfortunately, the boilers and engine were completely covered by hull debris, which prevented with technical descriptions of the ship. Much of the structure is fractured, corroded and covered by sediment.

The key find of the expedition was the discovery of rounds of 30 and 50-calibre ammunition and 3-inch artillery shells. Manufacturing marks from the base of a three inch shell were recorded and bottles and jars were also located. Historic records state that the ship was laden with both a cargo of ammunitions and provisions.

The ship lies on its starboard side with the bow facing north. The hull has broken into four main sections. Unexploded ordnance make this a hazardous site.

Soon after the identity was verified, a protected historic shipwreck protected zone was declared.

In spite of elaborate preparations and the expenditure of large funds, only three of the vessels which set out for the Philippines were successful in piercing the blockade.



Tas Heritage

JOURNEYS TO THE UNKNOWN SOUTH-WEST

Part II - Attempt on Port Davey

(Extracts from an article by Clive Lord 1926)



On Tuesday the glass was still falling, and the wind "being from the west, with rain, we had a quiet day's fishing in Recherche Bay, but on the following day prospects were a little better, and we decided to have a look at the south coast, although the exceptional clearness of the distant landscape gave promise of strong winds in the near future. From off Whale Head we had a fine view of

Pedra Branca and Eddystone, which lie 17 miles or so to the south-south-east and form rocky outposts to the Tasmanian coast. Pedra Branca was so named by Tasman in 1642 owing to its likeness to a similar rock on the coast of China, whilst Eddystone was called so in 1777 by Captain Cook during his third and last voyage to the Southern Seas.

It may be safely said that there is not an adequate harbour between Recherche and Port Davey. Looking further westward from the Ile du Golfe the southern coastline presents a picture of inspiring grandeur. Rising sharply from the sea coast the imposing outline of Precipitous Bluff forms an impressive landmark, and reminds one of the outlines of Barn Bluff in the North of the island. The sharp pointed Lilleateah and the massive mass of the La Perouse Range are near at hand, whilst to the north, looking up the valley of the New River, the sharply outlined summits of the Arthur Range appear in the distance and compel admiration owing to the variety of their outlines. Further to the west lie the jumbled mass of 'mountains which surround Port Davey, and continue almost to the sea, where they terminate in the small cone-shaped extremity of South West Cape.

As we crossed the bay there appeared in our course the Maatsuyker Islands, the largest of which appears on the maps as De Witt Island, but the group are generally referred to by fishermen as "The Witches," and De Witt Island as "The Big Witch." The Maatsuyker lighthouse is on the more southerly of the two larger islands, whilst in between are several smaller rocks, one of which is known as "The Black Witch," and another pair as "The Sisters," while still further south the Mewstone stands out as a great statue far out at sea.



[the weather soured and they ran back to Recherche, later another attempt was made and they returned to the South Coast and anchored in Cox's Bight]



Showers of rain and wind, with whirling westerly gusts from off the hills, were almost continuous, but as long as the wind held from the west we were sheltered by the high land, and were able to obtain some good fish, and also to land without trouble. Our anchorage afforded a great change from "the wooded hills of Recherche. In place of the eucalypt-covered slopes there were rocky shores of white precambrian schist and quartzite, fringing belts of dense melaleuca and bauera scrub, whilst the steep slopes of the hills were covered in part with button-grass and minute highland vegetation broken up by clumps of eucalypts. Above all rose the bare white rocky summits of fantastic shapes. The inner curve of Cox's Bight consists of a long white shingle beach of an entirely different shape to that shown on the admiralty charts, and the curve of

the beach is broken by a single projecting headland, somewhere in the vicinity of which a prospector, well on in years, recently landed with 12 months' provisions in order to seek his fortune single-handed in this western country. Such is the spirit of the pioneers who seek out Nature's secrets in such localities as this.

The following day the everlasting westerly held sway, but the sea was making slightly, and the roll coming into the bay caused us to move our anchorage to a more sheltered position. We were able to go ashore, however, and, although we could not leave the boat for long, as the wind might have changed to the south at any time, and made our position untenable, we were able to climb several of the headlands above our anchorage, and look out first across the large lagoon towards the Bathurst Range arid Mount Counsel, over the low-lying land reported to be so rich in tin and other metals, then to the north-west, where the projecting arm of Port Davey stretches out to within a few miles of Cox's Bight, which factor made one realise how near and yet so far we were from our hoped-for objective.

On Friday morning we got under way at 4.30 and stood out beyond New Harbour Buff with a light wind, but fairly big sea. Weather indications were by no means good, and as time was getting short and even if we had been fortunate enough to get to Port Davey there was the chance of being blocked in there for some time-it was decided to make the most of a fair wind and return homeward. Naturally, our disappointment was keen, but, all things considered, the decision was probably, the wisest one under the circumstances.



Doing it the easy way

A 1933 Windhover Flight to Port Davey



"A complement of passengers left Hobart on Sunday in the Strait air service amphibian flying-boat Windhover to visit the scarcely-known region around Port "Davey. Leaving Hobart the Windhover flew down the Channel to Recherche Bay, then across country past Mount La Perouse on the right and Prion Bav on the left. The snow-covered Bathurst Range was crossed, and Bathurst Harbour was reached, which, with its many bays and inlets reminded the travellers of Sydney Harbour; but looked far more beautiful with its several Islands and surrounding hills and mountains reflected in its mirror like waters. Flying about 20ft. above the water the many bays were



seen to advantage. Still about the same height the Narrows were crossed into Port Davey, where the Windhover alighted.

A party of gold seekers put out in a dinghy and conveyed the visitors to shore. The wheels of the amphibian were then lowered and the plane taxied on to the beach, where a couple of delightful hours were spent, some of the party climbing a nearby mountain.

After all were aboard again the pilot (Mr. N. M. Chapman) steered a course for the Great Lake country, passing over dense and apparently impenetrable forest, gaining an altitude of 5,000ft. Range upon range of snow-covered mountains could be seen, presenting a dazzlingly beautiful sight. Among some of the mountains crossed small lakes appeared, probably never before seen by white people.

Launceston was reached shortly after 2 .p.m., where the remainder of the day was spent, the party returning to Hobart on Monday morning.

It is considered that if Tasmanians only knew their own country by this modern method of transport and broadcast its beauties there would be a far greater number of tourists to the State."



Perhaps not so easy, she crashed a few years later on King Island

Qld Feature

Myora (Moongalpa), Stradbroke Island

I lived in Brisbane for nearly ten years and visited Stradbroke Island about 6 times at least. Every time I drove right past Myora without giving it a second thought. When you dig a bit more into the story Myora is one of those odd spots where everything that's odd or unique about Moreton Bay has happened there, or can be found there.

Aboriginal history

Dunwich and Myora, were important meeting places for Aboriginal people. Shortly after the Moreton Bay Penal Colony was established in 1824, the colonial authorities established a pilot station on Stradbroke Island (Minjerribah). By 1828 permanent settlements had been made at Amity Point (Pulan) and Dunwich (Goompi).



A cotton plantation was established at Myora on an important Aboriginal campsite and tempers flared. Between 1831 and 1832 there were more than ten violent clashes between the Europeans and the Minjerribah people resulting in deaths on both sides. The settlements closed. Stradbroke Island's poor grasses protected it from further claims by pastoralists.

In 1847, all the Ngugi people were moved to Stradbroke, leaving Moreton Island permanently vacant. As free settlers moved in and the crown land sold or leased, Quandamooka peoples were also dispossessed of their land. Some drifted into towns and others were rounded up and confined to the Myora mission.

The Mission

In 1843 four Italian priests attempted to establish a mission, but it failed due to resistance by the traditional inhabitants. A second

successful attempt was made to establish a mission in 1892 at Moongalpa, a place that was subsequently renamed Myora. The word "myora" means meeting place in the Nunukul language. The mission was used to house relocated Aboriginal Queenslanders from other islands and the mainland. Inhabitants of a mission settlement at Bribie Island were also transferred to North Stradbroke Island in 1892.

Life at Myora was hard. There were some good houses, but the photos show that many were still living in traditional bark humpies. In the 1890s, there were eight families of South Sea Islanders and Aboriginals at Myora. Adults gathered oysters, fished, hunted dugong, and worked at the Dunwich Asylum.

In 1893, a committee of Brisbane philanthropists opened a reformatory mission for children at Myora. Under Queensland's laws, magistrates could remove neglected children, including any child born of an aboriginal or half-caste mother. Once removed children could be assigned to missions, or individuals could be licensed to take older children into service. This measure led to the 'stolen generation' of Aboriginal children. In 1898 the indigenous inhabitants also fell under the regime of the Aboriginal Protection Act which controlled all aspects of their lives.

Many indigenous people, including those from the Myora Mission, were employees of the Dunwich Benevolent Asylum. It opened in 1865 and closed in 1946. It was for non-indigenous people from throughout the state-the sick, infirm, indigent, disabled and people suffering from alcohol abuse. In the 1930s, it had around 1,000 inmates in 20 wards for men, four wards for women and a tuberculosis ward. Indigenous women and men did the hard, dirty and domestic work at the asylum. They were paid rations



and a little money. There were a series of efforts, including a strike in 1935, to end the rations systems and receive full and proper wages. These efforts were successful in 1944, just two years before the closure of the asylum.

The Myora mission school was abandoned in the 1930's. In the 1940's all of the Aboriginal families had to move from Myora to Dunwich and the Mission Reserve was de-gazetted in 1943.

The Myora Aboriginal cemetery remains to this day and represents a special place for former mission residents. Also visit "Terra Bulla Leumeah" at Myora for an inciteful look at the original mission site and the well laid out variety of plants used for bush food. Some material remnants of the mission are still present on the block today and include five large old mango trees, a large bush lemon tree and cypress fence posts.

The Killing of Cassey

[warning - this article portrays persons who have passed away]

In 1896, an inquest into the death of a five year old Aboriginal girl called "Cassey" provides us with a rare window into life at Myora.

A committee of Brisbane philanthropists ran the mission and employed a white matron and a white supervisor. They were given only scanty resources and justified their work as providing moral leadership to Aboriginal people.

On the morning of 14 September 1896, Marie Christensen conducted several children to the beach to bathe them. It was widely understood at Myora that five year old Cassey was ill, but Christensen plunged her roughly into the sea. Afterwards, Cassey collapsed on the beach and refused to walk up the hill. Christensen snapped off a green switch, and whipped the child. Beatings were not unusual at the mission. When the whippings failed to budge Cassey, Christensen dragged her by the arm. When they reached the top of the hill, she insisted that Cassey walk, Cassey asked for an older Aboriginal boy to carry her. Christensen found another switch and thrashed Cassey, then hurried to her quarters and retrieved a cane. In a few minutes she was back, and beat Cassey's legs.

Christensen's shouts attracted the attention of several people who came to the scene but where ordered to put the girl down. The child was inert and gasping. Christensen took Cassey into the dormitory where she resumed caning her. Cassey did not eat after the day's beatings. Three days later the schoolmaster asked for the Asylum doctor. At about 11:00 the next morning, Cassey died.

The doctor used a bureaucratic ruse to evade demands that he issue a death certificate, thus assuring an inquest. Fewer than one per cent of inquests investigated the deaths of Aboriginal people, who also were rarely among the witnesses at inquests. The Magistrate was a local settler, and unusually he accepted the testimony of four non-European witnesses, although he helped to fudge some of the gorier details.

The *post mortem* findings said that Cassie had more than thirty contusions on the buttocks and legs. They alone could not have killed her; she was emaciated and anaemic. No one said that Cassey's state might have been a result of the mission's negligence. The attention was focused on an 'aberrant' white individual. The prosecutor settled on a charge of manslaughter.

The case was well-covered in the press. Christensen pleaded guilty to manslaughter and got two years hard labour at the Toowoomba Gaol, wholly suspended on agreement that the defendant would enter a bond of £100 to be of good behaviour.



The government acted when the poor conditions at the mission became widely known among white voters. The conditions at Myora soon lapsed again and remained poor even by the standards of the time.

Industry at Myora

From 1850 onwards fishing became a major industry on Stradbroke. Free settlers utilised Aboriginal local knowledge and techniques as much as possible to catch dugongs for oil and establish oyster banks.

In 1892 well known historian Thomas Welsby set up a dugong boiling down plant near Myora to extract the dugong oil used in lamps, for cooking, and in medicine.

However, local fishermen did not heed the warnings of local Aboriginal people and due to bad management and greed, the area was fished out and the dugong oil industry collapsed.



By 1901 oyster farming was well established on the Island, but a plague of mud worm wreaked havoc on this enterprise. Oyster farming had been the biggest seafood industry in Queensland at that time, employing many Aboriginal and European workers for years. The outbreak of mud

worm was devastating but not terminal, and through perseverance the industry survived and still prospers in Moreton Bay.

The Oyster industry management plan for Moreton Bay Marine Park foresees an end to farming. A number of oyster areas within the Myora oyster growing areas are not to be reallocated in the event they are surrendered, cancelled or not renewed. A voluntary option of relocating these oyster areas to an unused oyster area is also available.

Maritime Heritage

Myora was also one of the first places to trial oyster farming in Queensland. One of the more prominent relics is the hulk of the old dredge "Hercules".

The 895 ton, 230.5 ft long steel dredge was built at Walker-on-Tyne, U.K., in 1900. The "Hercules" helped dredge the Suez Canal before being moved to the Brisbane River. For 17 years she was dredging the



shipping channel and built up the mouth of the river with the spoil. Her skipper at the time was a Capt. Bishop. He gave his name to the artificial island at the mouth of the river.

A local shop owner, Mr. Dixon, wanted to set up an oyster farm at Myora, but marine predators kept eating his oysters. He bought the old derelict dredge "Hercules" and pulled her ashore on the mud about half a mile north of Dunwich. He flooded the hulk and kept his 20,000 oysters inside, and used the rest of the structure as a splitting shed.

Relics of old oyster leases can still be seen edged out in the tidal flats, while old vessels once used on the oyster leases rust away nearby.



Natural Heritage of Myora

Coastal oasis



Inland swamps on Stradbroke are usually dominated by paper-barks. A small patch of dry rainforest and vine scrub occurs at Myora. Myora Springs, 4kms along East Coast Road, is well

worth a visit and has a grassy picnic area and swimming hole. Myora Springs is a pristine source of natural spring water surrounded by a small tropical forest. There are also wild koalas.

Myora Springs is a unique area as Capembah Creek provides a constant direct fresh water input to the mangrove community, creating an unusual habitat and a source of fresh water for wildlife. In the forest surrounding the Myora Springs there is an abundance of freshwater crayfish, prawns, bungwal fern and other plant foods and so it was a favoured camping place for Aboriginal people. It is possible to see parts of the large middens on the banks, which contain, amongst other things, cockle, oyster and whelk shells. There is also plenty of unique flora and the area is popular with school groups on wetland discovery courses. The area has been reserved for nature in some form since 1969.

Underwater Marvels

The shoreline is dominated by fringing *Avicennia* with patches of *Rhizophora* mangroves. These give way to a long inter-tidal foreshore flats. As the water deepens there are extensive seagrass beds including *Zostera*, *Halophila* and *Syringodium*. Bream, flathead, cobia, snapper, garfish, school mackerel, sea mullet, tailor, whiting, banana prawns, eastern king prawns, bay prawns, mud crabs, wobbegongs, bamboo shark, sand crabs and oysters are found in the area, but it's a no fishing zone.

There is also a small natural reef at Myora which is unusually rich in corals. There is 46 percent hard coral cover, mostly plate coral growth forms (*Acropora*). Eighty percent of rock surfaces are covered with turf



algae which is grazed on by *Diadema* urchins at an abundance of 4 per 100m². *Drupella* snails, which can cause reef damage if they breed out of control, were found at low densities of around one per 100m². It isn't picture postcard coral reef in clear waters, but it is a unique habitat for this kind of embayment. Myora Reef is a no-fishing zone in the Moreton Bay Marine Park.

The reef area is also adjacent to some vast seagrass beds on the eastern banks of Rainbow Channel. A large meadow (~6.5km²) is dominated by *Zostera capricorni* with a mixture of other species. The species composition varies a lot and in 2004, it was being colonised by fast-growing paddle weed (*Halophila ovalis* and *Halodule uninervis*).

Expanding populations of the nuisance algae *Caulerpa taxifolia* have been recorded at One Mile Harbour and Adams Beach off North Stradbroke Island. *Caulerpa taxifolia* occupies the same niche as seagrasses, and because of expanding populations, they are frequently found competing with seagrasses. The extensive seagrass flats and in particular the Eastern banks Region are very important for fisheries, turtles and dugongs.

Seagrass meadows form one of the most important marine habitats globally and occur in shallow coastal waters including Moreton Bay. The distribution of seagrass within Moreton Bay is primarily determined by the amount of sunlight penetrating the water to the sea floor as well as the amount of disturbance and water quality. Seagrass is a good indicator of water quality, with changes in seagrass distribution used to map changes in environmental conditions.



Since the late 1980's there has been a loss of roughly 2300 hectares of seagrasses in south east Queensland. Turbid water from sediment runoff from the mainland, *Lyngbya majuscula* algal blooms, and impacts from boat moorings/anchorage are key threats to seagrass meadows. Many moorings rip up seagrass beds which result in a 'crop circle' pattern being present around moorings which can be seen in aerial imagery.

False water Rat



Myora Springs is home to the False Water Rat, which is a rare nocturnal mammal that was thought to be extinct until rediscovered here 1978. The false water rat has subsequently been found in the central and southern parts of Queensland, North Stradbroke Island off the coast of Southeast

Queensland, Melville Island, and southwest Western Province, Papua New Guinea.

The name of the False Water Rat is misleading – it is not truly aquatic, and it is actually a mouse. Its small size, dark grey fur and white belly make it clearly distinguishable. It is commonly known as the False Water Rat because it is related to Australia's true water rat but lacks the webbing of the hind feet.

The False Water Rat lives in coastal wetlands such as lagoons, swamps and sedged lakes close to fore dunes close to the coast. It forages in mangrove forests for small crabs, shellfish and worms. The False Water

Rat builds large mud nests like termite mounds, up to 60 centimetres high and usually in areas where they can escape the highest of tides. They often use exposed tree roots to form the foundation for the mounds. They aren't aggressive and are very sociable. Humans can sometimes gently pick them up.

It forages amongst the mangroves at night when the tide is low, and when the tide rises it returns to the adjacent sedglands for shelter.

They are fussy about real estate and also like to have a small stretch of saltmarsh, covered in long grass, to act as a safe corridor between the mangroves and their nest on the edge of the forest above the high water mark. The results of surveys show that the false water rat is absent from many sites where habitat is suitable. Apart from the known populations on North Stradbroke, quite a large population was found on Russell Island but the other islands showed either very few nesting mounds or none at all, despite the presence of good false water rat habitat. Some of the islands had obvious reasons for their disappearance usually in the form of habitat loss and pollution.

The False Water Rat is listed as vulnerable. Mangrove and other coastal wetland communities are widely threatened by development for residential and recreational purposes and to a lesser extent for agriculture and aquaculture. Foxes and feral pigs also prey on them.

Mouse food



The Shawl Crab *Atergatis floridus* is found under rocks and in dead coral on muddy sandflats. They are common on Stradbroke and are also found in tropical Australia and the Indo-West Pacific.

Oodgeroo of the Noonuccal

[warning - this article portrays persons who have passed away]



Known until 1988 as Kath Walker, Oodgeroo attended Dunwich State School until 1933, where her father had been an equal pay activist. At the age of 13, she left to take up work as a domestic servant. The conditions were poor but she had no other opportunities because of the strong prejudices of the time. In 1941 she enlisted in the Australian Women's Army Service (AWAS) until invalided in 1943. She married and got a job in a smallgoods factory in Brisbane. She then became involved in the Communist Party of Australia—the only political party in Australia that did not support the White Australia policy. By the time their son Denis was born in 1946, the couple had separated, and Kath Walker was forced to raise her son on her own. Walker returned to domestic service, working in the household of two prominent doctors, Sir Raphael and Lady Phyllis Cilento. They became life-long friends and the Cilento's encouraged her artistically. In 1953, she gave birth to a second son, allegedly fathered by the Cilentos' son.



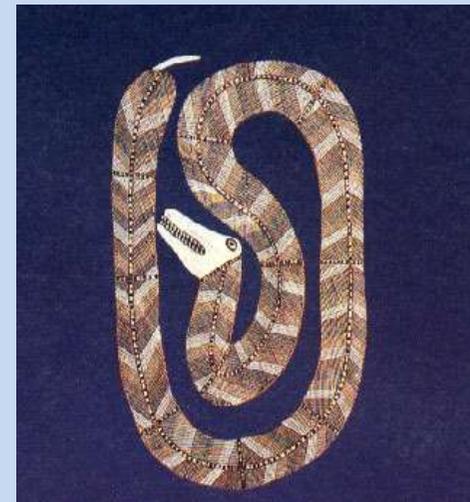
In the 1950s, she became interested in writing poetry. By the late 1950s she had joined the Realist Writer's Group. In 1963, she submitted a collection of poems to Jacaranda Press, published as *We Are Going*. The work was an immediate commercial success, selling more than ten thousand copies and making Walker the best-selling Australian poet since C. J. Dennis. She had a plain-speaking style and a strong element of protest. Walker became increasingly engaged in political activism in support of Aboriginal rights, social justice, and conservation. In 1969, she unsuccessfully stood as the ALP candidate in the electorate of Greenslopes. At the end of the 1960s, joined the Brisbane Aboriginal and Islanders Council and the National Tribal Council (NTC), of which she was briefly chairperson. Power struggles within the Brisbane Council led Walker to leave the organisation in 1971 and return to her ancestral home of North Stradbroke Island.

She assumed the role of educator and cultural guardian and ambassador for her people establishing the Noonuccal-Nughie Education and Cultural Centre at Moongalba (Myora). Walker also travelled widely

and even survived a hijacking on a flight from Nigeria in 1974. In 1978, she was poet-in-residence at Bloomsburg State College, in Pennsylvania, USA, and visited a number of other US Colleges. She published a number of books of Aboriginal legends aimed at young readers. In 1988, as a protest against continuing Aboriginal disadvantage during the Bicentennial Celebration of White Australia, Walker returned her MBE, and adopted her Noonuccal tribal name Oodgeroo (meaning "paperbark"). Oodgeroo died at her home on Stradbroke Island on 16 September 1993.

*I could tell you of heartbreak, hatred blind,
I could tell you of crimes that shame mankind,
Of brutal wrong and deeds malign,
Of rape and murder, son of mine;*

*But I'll tell instead of brave and fine
When lives of black and white entwine
And men in brotherhood combine--
This I would tell you, son of mine.*



Fast facts about Stingrays, Skates and Stingarees

How big (or small) do skates and rays get?

A stingray is a type of fish related to sharks.

Skates and rays range widely in size. The smallest rays in the world are the size of a pancake, measuring 10 cm across weighing only 0.5 kg. The biggest ray is the manta ray which can reach up to 9 metres in width and may weigh many tons!



Tasmania's skates and rays are also varied in size, with the biggest one being the smooth stingray at 1.2 metres across, about as wide as an 8 year old is tall.

How long have rays and skates existed?

Skates and rays are among the oldest surviving group of animals with a jaw and a backbone, first appearing in the fossil record about 150 million years ago in the time of the dinosaurs. They have survived a number of major global extinctions. As they have cartilage rather than bones, stingray fossils can be pretty hard to identify as you only see occasional teeth and scales.

Are electric rays really electric?

Yes they are! All electric rays have a pair of specialized organs capable of producing an electric discharge, varying from 8 to 220 volts (the voltage of a battery or a power plug), depending on the species. This is used to stun or kill prey. They might also use it to 'talk' to each other during mating.

Tasmania has an electric ray, only found here, called the Tasmania numbfish. The numbfish only gives out a mild shock.



The ancient Greeks and Romans used electric rays as a treatment for many illnesses like headache. Electric rays were also used by the ancient Greeks to numb pain. In fact, the word 'narcotic' stems from *narke* which is the Greek word for these rays.

Do skates and rays have predators?

Most sharks and rays aren't big predators of humans, but they eat small fish and get eaten by lots of other bigger fish, and humans. Skate eggs are eaten by animals ranging from snails to sperm whales. Young and old skates and rays are also eaten by sharks, bigger stingrays, and seals. The greatest "enemy" of skates and rays is humans. Many species of skates and rays have dropped in numbers a lot in the last few decades due in part to over-fishing.



How do skates and rays avoid predators?

Skates and rays have many ways to avoiding being eaten:

- 1) They can make themselves hard to eat by having thorny bumps and venous spines
- 2) They can swim off at very high speeds in short bursts.
- 3) They can hide in the sand, and take on colours and bumps that make them hard to see.
- 4) They can go into shallow water where big sharks are frightened to follow.
- 5) They can hunt at night.

Do skates and rays live only in the ocean?

A few can live in fresh water too. Tasmania has the only species of fresh water skate in the world called the Maugean Skate. Freshwater rays are in decline around the world due to pollution and destruction of habitat. The Maugean Skate is also a threatened species.

