

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, Michael Jacques, sooty tern, Lord Howe Island



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(18mg of sugar with each 35 page serve, cutesy photos not recommended for diabetics

May contain traces of dolphin)

Surf Dog Photo



No-one has complained of too many irrelevant cat photos, so I thought I'd double our readership to 4, with dog lover pics. I don't know what it has to do with marine conservation, and the dog can't surf for s*&t anyway.

It is cute though and when you feel happy, you buy, and surely we are totally sick of emotional blackmail using cute dolphin shots, so why not dogs. OK, we aren't sick of dolphin shots...Oh God! That's so sweet. Don't they almost look human...subscribe today. marinelifetassie@gmail.com



Eels on the Move



Tasmanian scientists are monitoring eel behaviour in the hope a bypass can be made to get around a 30-metre dam wall that blocks eel migration.

Trevallyn Dam blocks the movement of eels between the Tamar estuary and the South Esk River.

Hydro Tasmania built a "fish ladder" at the dam wall several years ago but it was only suitable for juvenile eels, or elvers.

Now the eel population is being monitored with sonar around the Trevallyn Power Station, dam and tailrace.



"We're looking at the hard part, and that's getting the adult eels back down into the estuaries so they can go and spawn," Mr Ikedife said.

"So that's why we're taking these steps to understand their behaviour.

"With the data that we've got, we can really take confident steps into putting in a downstream bypass structure if the feasibility stacks up."

Right Whales boom in the Bight

This year's count at the Head of Bight in South Australia has sighted record numbers of southern right whales.

A team of researchers at the Head of Bight on the edge of the Nullarbor Plain have counted up to 172 whales including 81 mothers with calves on a single day. The record numbers were consistent with the expected 7 per cent growth rate. Their numbers are still very low compared to what they were pre-whaling.

At one point there was less than 300 southern right whales in the world and it's only since the 1970s and '80s that we've seen the whales return to Australian waters.



Curtin University Great Australian Bight Right Whale Study.

There are an estimated 12,000 southern right whales in the world now with sub species in Australia, New Zealand, Argentina and South Africa. About 100,000 southern rights cruised the oceans before whaling but more than 75 per cent of them were slaughtered by 1845.

Females give birth every three to four years and reach sexual maturity at nine years of age. Adults can grow up to 18 metres long, weigh 80 tonnes and are believed to live for about 80 years.

The Head of Bight Visitor Centre at the 55m high Bunda Cliffs overlooking Head of Bight, has been inundated with about 250 whale watchers a day.

The whales come very close to shore usually within a few hundred metres and sometimes as close as 60 metres. Its shallow, sandy bottom, protection from wind and its location within the Great Australian Bight Marine Park has helped Head of Bight become one of the largest southern right calving areas in the world.

"The sanctuary zone here is really doing a good job of providing the protection that the whales need, which also encourages other animals into the area," Dr Charlton said. "There's a full vessel closure in whale season and a total exclusion zone – it's something we should be really proud of here."

A BP proposal to drill for oil about 200km offshore from Head of Bight has sparked environmental concerns and prompted a visit to the area by marine activist group Sea Shepherd last month.

It should be noted that the populations in the SE, which were hardest hit by hunting, and are now noisy developed areas with lots of boat traffic, are not showing noted recovery in southern right populations.

Damselfish relocate to cool off

Rising ocean temperatures makes fish leave home.



PHOTO: Dr Jodie Rummer)

Scientists exposed damselfish to changing temperatures in a laboratory. The highest was 33 degrees Celsius, similar to sea surface temperatures seen this years bleaching event.

Dr Jodie Rummer from James Cook University said, "If they're given a choice, they will move toward around 29 degrees, even if they've been held at temperatures higher than that for a really long time, they still prefer that temperature at which their metabolism functions optimally," she said.

Dr Rummer said, "What we're also noticing is that various species are moving away from the equator, they're moving to higher latitudes to escape these really warm temperatures that they're experiencing.

She said the team would also attempt to find out if the fish could adapt fast enough genetically to keep pace with climate change.

AI computer looks for dugongs

An AI network is speeding up photographic analysis for dugong population counts

PHOTO: Ahmed Skawky)



Dr Amanda Hodgson estimates she has stared about 30,000 photographs of the ocean looking for tiny distortions that indicate a dugong on the surface. "You can go mad doing that I think," she said.

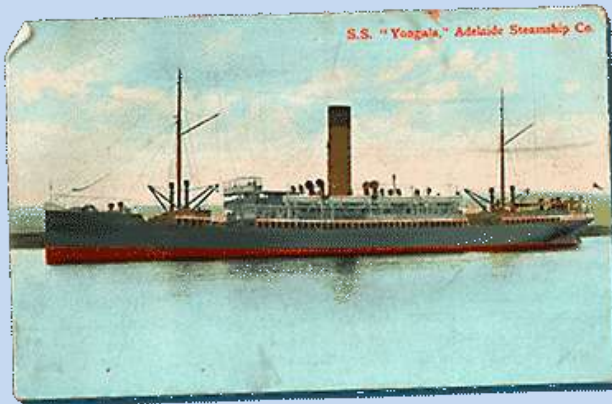
Dr Hodgson said aerial surveys were regularly conducted off the coast of Queensland, in the Torres Strait and Shark Bay off Western Australia. But drones have allowed researchers to survey areas that previously could not be reached. But it also meant researchers had to manually check the tens of thousands of images they captured.

Artificial intelligence expert Dr Frederic Maire used software called TensorFlow to create an artificial neural network to detect dugongs in the aerial images. Dr Maire said it had to be trained to spot dugongs, with researchers uploading images and pointing out the mammals.

Dr Maire said it had been detecting 80 per cent of the dugongs, but its success rate was expected to improve.

The researchers believe the possibilities for the technology are endless.

WTF –dive ‘goes wrong’



A scuba diver was missing for more than 17 hours after trying, on his own, to dive the dangerous, remote and tide-swept wreck of the Yongala.

A 68 year old diver from SE Queensland took his private boat to solo dive the wreck of the Yongala. Police were called by the man's friend at 6:45pm, and they found his empty boat moored at the dive site with no-one on board. Rescuer Alan Griffiths was on a helicopter that had been searching for the missing man for 90 minutes and was about to head back to the base to refuel when the diver was spotted about 11:00am.

The media article focussed on 'luck', EPIRBs and 'lottery tickets' while missing the real problem, was he completely mad?

In a previous article, this is what I had to say about the site, "This site is in the middle of nowhere, not in a picture postcard lagoon with mirror like waters, but exposed to every current, storm and sudden gust. While promoted heavily as something easily accessible, divers need to be ready for frequent cancellations and some discomfort while at sea".

I mistakenly went on to say there are 3 ways of getting there, a scheduled liveaboard trip, or a 3 hour trip in a day cruiser from Townsville, or by fast and bumpy boat 30 minutes from Ayr. I was wrong, there is a 4th way which involves trying to commit suicide in your own small dinghy. It's made all that more

satisfying for the Grim Reaper if you dive solo as well. Stating the need to be extra cautious with your diving choices at age 68 isn't ageism.

In 1911, the S.S. Yongala left port and was never seen again. All 121 passengers and crew disappeared without trace. It was pretty clear what had happened, she was hit by a massive cyclone and sank about 48 nautical miles from Townsville near Cape Bowling Green. The site suffers from heavy tides, is remote and exposed to bad weather. The dive itself has fantastic fish life. Well worth doing, but there are easy ways, and silly ways.

The advertising makes the dive sounds easy, but the commercial operators have the risks well-controlled, so controlled it is a bit off-putting, "If the operators have timed it right, you should be sheltered from the current by the hull underside..." Obviously this diver was ignorant of the current. In fact, he was swept away as soon as he entered the water. A lookout could have retrieved him easily. He's only alive because he told his onshore mate where he was going.

The cost of doing it in your own boat dive to the Yongala can hardly be much less than the fees of a well-managed charter. This also ignores the law. It is a protected site and only a permit-holder can visit it. Let me guess, you were taught not to dive like that, but you decided 'what would they know'?

Recently we have had a tragic spate of water deaths and other incidents. Things do go wrong anytime for anyone, but this adventure didn't "go wrong", it was totally wrong from the outset and in an obvious way. Be careful out there, for yourself, your family, your buddies, and the people who have to risk their lives to rescue you.

Macquarie Harbour salmon farm impacts

There is consensus, the harbour is overstocked with fish and cannot cope with the Government's over-ambitious expansion plans.



Tasmania's salmon and trout industry employs 1,500 people and pumps hundreds of millions in to the rural economy. There were plans to double the size of the industry by 2030, with some of that expansion occurring in Macquarie Harbour.

There are 1,000 hectares of salmon farms on Macquarie Harbour now, but 2013 plans to triple fish stock numbers were put on hold when problems emerged in May 2015. Despite a big fish kill of 85,000 salmon that summer and declining oxygen levels in the harbour, the government still went ahead with plans to allow further expansion of stock numbers, twice permitting increases. Huon Aquaculture told the Tasmanian Government about the need to reduce fish stocks in the harbour on three occasions in 2016.

The Government was also given scientific reports and data showing concerning temperature spikes and dangerous drops in water oxygen levels in February 2016.

Secret emails emerged showing producer concern about waterway health, and referred to a disease outbreak in Tassal pens, saying it represented a "clear warning sign that the environment we are growing fish in is becoming compromised".

One of the smaller farmers (Huon) broke ranks and went public, leaving Tassal uncomfortably holding the spotlight for all the troubles in Macquarie Harbour. This is slightly ironic as Huon was in trouble in 2015 for similar issues in Port Esperance and the Huon River. There was talk of "junk" science being used to justify increases, and this culminated in a recent "4 Corners" investigation.

Petuna and Tassal have continued to say that salmon farming in Macquarie Harbour was having a "minimal" impact on the waterway.

The Tasmanian Government also commissioned New Zealand's Cawthron Institute to conduct an inquiry. In their report researchers confirmed a waterway under stress, with plunging dissolved oxygen levels and rising ammonia and nitrate levels. The EPA has since cut allowable stock numbers, (to 14,000 tonnes. The producers only ever stocked to 16,000 even though the government originally approved 21,500 tonnes). The EPA admitted that fish farming was having a detrimental impact on the harbour. Further Macquarie Harbour expansion plans look dead. Planned expansion at Okehampton on the East Coast, is already attracting criticism.

Instead the expansion plan may have to be fulfilled with more open ocean pens. For 18 months Huon Aquaculture has been putting "fortress" pens out in Storm Bay, which are designed to be seal and bird-proof and strong enough to withstand offshore conditions. They have also recently applied to have a new facility erected off Port Stephens in NSW.

"This is a monster pen, this is the new 240-metre circumference fortress pen, fantastic for open water like Storm Bay, they're flexible, everything needs to be able to move in the open water

otherwise if you have things that don't move they break," Ms Bender said. It is a part of the company's \$200 million, 200 hectare investment in offshore leases. Petuna says it is also interested in any opportunities in Storm Bay.

Laura Kelly from Environment Tasmania said she was cautiously optimistic about the offshore proposal, but more information was needed. "It confirms what scientists and leading producing countries have been saying for years, which is that in-shore salmon farming is dead," she said. "One key detail that we need to see is the company's timeframe for withdrawing from already damaged in-shore locations, including Macquarie Harbour.

I doubt there will be any complete withdrawal from Macquarie Harbour. It will continue to be farmed as it is in many ways otherwise a good location at an appropriate stocking level, with the environment there requiring a lot less antibiotic use than other inshore sites.

Professor Stewart Frusher, from the Institute for Marine and Antarctic Studies (IMAS), said moving the entire industry offshore was where the future lay, and would have wide-ranging benefits. "Our coastal zones are now such crowded spaces - we have a lot of recreational activity in them, we have ports and harbours, we have existing fishing, and so there's really not going to be that much room," he said.

"[Moving offshore] minimises some of our biosecurity issues, it takes us away from some of those extreme events like flooding, sedimentation that occurs in our coastal zone, as well as pollution in our coastal zones." However, he said the concept was still in its infancy in Tasmania, and more research needed to be done.

I can see open ocean pens immediately fuelling recreational and commercial fisher concerns about impacts on wild fish populations. This already occurs in the USA, were moving offshore hasn't allayed concerns about antibiotic use and disease. You can still overstock an open ocean pen, but that

might just be at a higher level where the current is better at flushing waste away. Recreational fishermen have recently proved themselves to have industry-killing political power when they feel threatened, despite any science to the contrary.

The Storm Bay 'offshore' lease has been around as an experimental site since 1996 and is located 1.5kms off Trumpeter Bay in North Bruny Island. A 1998 amendment allowed the leased area to expand to 4 sites totalling 660.4 ha outside the existing lease. The proposed site extends 7.5 kilometres parallel to the coastline. Rather than being assessed at the time as a new farm, it was treated as an amendment. I assume this short-cut was to fast track it and also because at that time there were no firm proposals to stock it with pens. Public submissions drew attention to the scant research data on the local impacts of a fully-stocked farm of this size.

The site also isn't really offshore, but close to moderate depth low profile coastal reef. Offshore farming generally means more than 4 miles offshore, but that is in deep and differently regulated Commonwealth waters, far from supply bases. What we actually have is a half-way house between inshore and offshore farming. Similarly, Tassal plans for a site off Wedge Island isn't really offshore farming, although they don't explicitly claim that it is.

I think that the take home message from all this trouble is, just thinking up an aspirational growth target, then rushing through a major expansion, then following along afterwards with the research investment and P.R. has proven to be a mistake. The companies need to put money up front with reputable agencies to do detailed research on the local impacts, then the government has to read the reports and follow the findings.

The local council recently approved the Okehampton development without waiting for the results of an investigation, although we should note that the planning act gives them strict time limits.

Maybe we can work on our processes and make more of an effort to convince people that the developer has done their homework, and that regulators are enforcing in the public interest. Then perhaps we can have a sustainable fish farming industry, rather than a series of ongoing dogfights as community confidence in fish farming continues to wane.

Studying Maugean skates

Australia, and specifically Tasmania, is home to what is possibly the rarest skate species in the world. With such a limited distribution, little has been known about the skate until now.

Primary Source FRDC



PHOTO: Neville Barrett

The Four Corners report also highlighted concerns about the maugean skate. It was only discovered in 1988 and is confined to the upper reaches of Bathurst and Macquarie harbours.

The skate appears to have disappeared from Bathurst Harbour, with no detections for decades. The only other population is thought to be about 3,000 strong in Macquarie Harbour. The Tasmanian Government admits the skate's "numbers are low", but does not have a recovery plan to protect the species. The EPA said skate population numbers appeared to be stable at the moment and two separate research projects were underway to understand fish farm impacts.

Biologist Jeremy Lyle, said more research was needed to find out what the skates — and in particular their eggs — can cope with, but it was highly likely further drops in oxygen levels would reduce in the skate's habitat, but to what extent remains unclear.

The Maugean skate lives in brackish waters, rich in tannins where there is very little other marine life. It is basically a deep-water species living in shallow waters. Of the 400 skate species identified worldwide, the Maugean Skate is the only one known to inhabit brackish water.

Despite Macquarie Harbour's remote location, the skate is competing with expanding aquaculture, tourism, and recreational net fishing.

A recent FRDC/IMAS project has identified the distribution, habitat, reproductive dynamics, feeding habits and population of the Maugean Skate in Macquarie Harbour. It has also assessed the impacts of current and proposed marine farming operations on the population.

Researchers spent 12 months monitoring the population of Maugean Skate using an extensive array of acoustic receivers positioned throughout Macquarie Harbour. Almost 60 Maugean Skate were acoustically tagged at multiple locations. Research fishing was also conducted over 15 months to assess

reproductive status and diet before releasing skate back into the water. All skate were microchipped before being released.

During the monitoring, the tagged skate were detected at depths of six to 12 metres, 85 per cent of the time, and occasionally at depths greater than 55 metres. Depth utilisation appears influenced by water chemistry. Shallow waters have low salinity and high temperature variability. Deeper waters are stable in



temperature and salinity but have low concentrations of dissolved oxygen. The intermediate depths that skate prefer are relatively stable in salinity, temperature and dissolved oxygen.

While some skate left their core range for brief periods (days to weeks), almost all returned. There was no evidence to suggest long-term movement of skate out of the estuary. This means that Macquarie Harbour's Maugean Skate are likely to be a distinct population. The project estimated the population of the Maugean Skate to be around 3200 individuals, although this may

be an underestimate. Maugean Skate were found widely distributed throughout Macquarie Harbour and displayed a high degree of site fidelity, with home ranges generally less than 10 kilometres square. Many skate showed an affinity for the Liberty Point/Table Head region, in the central, south-western side of the harbour.

Maugean Skate were more active at night and moved into shallower water, which probably represents nocturnal foraging. Their diet was dominated by crabs and shrimp. While there was no evidence of feeding on aquaculture pellets, this cannot be ruled out.

Preliminary estimates of age suggest the species is relatively short-lived. The maximum age observed was 11 years, but they may live to about 15 years. Maximum age (and size) is a useful proxy for productivity and suggests that Maugean Skate are probably relatively productive.

Recreational fishers say gillnetting is one of the few options that allow recreational fishers to catch edible fish in this area – generally flounder. The local fishers suggested closure to gillnetting of most waters in the harbour deeper than five metres, and the closure of the Table Head/Liberty Point region. The project also found that direct interactions between Maugean Skate and aquaculture operations was likely to be limited. Many people have called on fish farms to financially support more research.

Sharks, sharks, sharks



NSW State Parliament has fast-tracked a six-month meshing trial, and the Opposition has said it will provide in principle support for the shark-net bill.

The Government initially resisted calls for a rollout of shark nets on the north coast.

That changed last month, when there were three shark attacks in the Byron-Ballina area. We are now talking about nets to catch and drown sharks and other larger marine animals *en masse*, not the smart drum lines that were previously proposed. The program will see nets installed at Lighthouse, Sharpes and Shelly beaches at Ballina, Seven Mile Beach at Lennox Head and the Evans Head main beach.

Mr Blair said the meshing would work in conjunction with other measures already rolled out as part of the Government's \$16-million shark mitigation program.

The issue has divided the community, with hundreds of people protesting in Ballina. A day later a 36-year-old man was bitten on the leg while surfing at Broken Head.

Ballina Council endorsed a proposed shark net trial and asked that it be expanded to include the six beaches major beaches between Ballina and Lennox Head.

Former Greens' councillor turned independent, Jeff Johnson said "Sorry, as a regular beachgoer my primary concern isn't for the great white sharks, it's for our community and for our children". "If a few great white sharks die, so be it".

Keith Williams was one of two councillors who voted against the shark net motion. He told the meeting the nets were no guarantee of safety, but rather an ineffective form of culling. "If we want to talk about culling sharks, then let's talk about culling sharks — let's not talk about denuding the entire marine environment so that we get some."

Local surfer James Wood, a former world junior champion, said boardriders in the area were desperate for some effective protection. "It's not great for our environment, and none of the people that are for [netting] want to see this here for the long term," he said. "Hopefully we can get an eco solution, but for the short term we need this.

"Five nets in 50 kilometres, it's a way to make people feel that something is being done rather than actually keeping people safe," a protester said.

As the first net was rolled out, a protester dressed as a hammerhead shark tried to pull a miniature net over the Premier at an event. Everyone, including the police, seemed to take it in their stride. The Premier stuck to script, he's read the polling and explicitly referred to a change in community attitudes. Gone are his earlier courageous calls to trust in the science, "Our number one criteria with all actions we are taking is pretty simple, protecting human life".

More shark nets for NSW: Why haven't we learned from WA's cull?

By Leah Gibbs, University of Wollongong (via The Conversation)



PHOTO: NSW Department of Primary Industries

New South Wales Premier Mike Baird has this week announced a plan for a six-month trial of shark nets off the beaches of northern NSW. This would extend the state's shark net program from the 51 beaches currently netted between Wollongong and Newcastle.

The announcement was triggered by Wednesday's shark accident, in which a surfer received minor injuries from a shark bite at Sharpes Beach, Ballina.

The decision marks a turn-around in Mr Baird's position on sharks. For over a year he has acknowledged the importance of addressing the issue, and has adopted a measured, long-term, non-lethal approach to managing shark hazards. Specifically, the NSW government has, in the last year, allocated funding and resources to non-lethal strategies including surveillance, research and education.

Killing sharks has been highly controversial in Australia in recent years, and in NSW shark nets have been a focus of ongoing, highly polarising debate.

Three common misunderstandings about shark nets

The decision to introduce shark nets in the state's north invites us to revisit some common misunderstandings about this strategy.

First, there is wide misunderstanding about what shark nets are and what they do. The nets used in the NSW Shark Meshing (Bather Protection) Program do not create an enclosed area within which beach goers are protected from sharks.

They are fishing nets, which function by catching and killing sharks in the area. Nets are 150 m long, 6 m deep, and are suspended in water 10-12 m deep, within 500 m of the shore.

Second, whether shark nets work is still up for debate. Shark nets have been used in NSW since 1937. Since then, the number of netted beaches, methods for deploying nets, and data collection and record-keeping methods have changed, and data sets are incomplete.

Our use of the beach and ocean has also changed dramatically. There are more people in the water, in new areas, and we're using the ocean for different activities. At the same time, our observation of sharks and emergency response have improved dramatically.

The suggestion that nets prevent shark accidents is an oversimplification of a complex story, a misrepresentation of both technology and data, and it misinforms the public.

And finally, shark nets cannot be a long-term solution. They are out-dated technology based on outdated thinking, developed 80 years ago.

They go directly against our international responsibility to protect threatened species (under the International Union for the

Conservation of Nature and our own Environment Protection and Biodiversity Conservation Act), and our national priorities for protecting marine environments and species, including several shark species.

We know that shark nets in NSW kill on average at least 275 animals per year (measured between 1950 and 2008), and that the majority of animals killed pose no threat to people. We can do better than this.



Four Corners reports on analysis showing that Sydney shark nets have not reduced chances of attack.

Right now we have an opportunity in NSW to learn from recent experiences in Western Australia. In 2012, the WA

government, under Premier Colin Barnett, introduced hooked "drumlines" to kill sharks in an attempt to reduce the risk of shark bites. Like this week's announcement by Mr Baird, that policy change was stimulated by a spike in shark accidents.

The response to the new policy was a highly-polarised debate and extraordinary public outcry, including two public protests at Perth's Cottesloe Beach attracting 4,000 and 6,000 people, and protests in eleven other cities around the country, including 2,000 at Sydney's Manly Beach.

The state's Environmental Protection Authority received a record number of 12,000 submissions from scientific and other experts presenting reasons to cease the cull. The WA government heeded the EPA's recommendation and cancelled the policy.

Our research with ocean users conducted during this period showed that perspectives are diverse (we surveyed 557 WA-

based ocean-users using quantitative and qualitative research methods).

Among people who use the ocean regularly, some strongly oppose killing sharks; others are ambivalent; and a smaller number of people are in favour. People's views and understandings are nuanced and carefully thought through.

However, within this group, the strategies for managing shark hazards that were most strongly supported were improving public education about sharks, and encouraging ocean users to understand and accept the risks associated with using the ocean. Other widely supported strategies included developing shark deterrents and increasing surveillance and patrols.

The most strongly opposed approaches were those that killed sharks including culling, proactive catch-and-destroy measures, baited drumlines, and shark nets.

In recent years we have been making good progress in Australia on public discussion and investment in more effective and ethical approaches for reducing shark bites. This week's move to introduce an outmoded technology to the north coast promises to further divide the community.

We should continue to invest in developing new strategies that better reflect our contemporary understanding of marine ecosystems. Perhaps we also need to consider (temporarily) altering the way we use the ocean, avoiding areas of higher-than-usual shark sightings.

King George Whiting



You love catching them and eating them, but we have only recently worked out basic details like where they go to breed.

The King George whiting forms the basis of one of southern Australia's most important commercial fisheries, reportedly worth over five million dollars per year. The species is also heavily targeted by recreational anglers. The main commercial King George whiting fishery is centred on South Australia. This single species alone was reported as comprising 60% of the total annual catch in South Australia during the late 1980s. The King George whiting has differing size and bag limits for anglers in different states.

The King George whiting is endemic to Australia, and is found from SW Western Australia to the New South Wales border. A favourite habitat of young fish appears to be *Zostera* and *Posidonia* seaweed beds. Juveniles tend to form schools with

other species such as silver trevally, tarwhine and other species of whiting. Adults tend to be solitary and found in deeper water in a range of habitats including bays, offshore surf gutters, broken bottom and deep reef.

The fish find food on the seabed, including a variety of small crustaceans (amphipods, copepods), worms, molluscs and fish. Whiting do not rely on sight when feeding, instead sensing the vibrations emitted by their prey.

King George whiting, especially juveniles, are known to be common prey for a number of larger inshore fishes and wading birds. The most prominent inshore predators are Australian salmon, members of the flathead family, the barracouta, snook as well as various species of sharks and rays. Various species of diving birds, particularly the pied cormorant are also common predators of the species, as are marine mammals such as bottlenose and common dolphins.

King George whiting reach sexual maturity at three to four years of age, with males reaching 30 cm in length and females 34 cm. May and June are the most common times for spawning, with some spawning events recorded as early as February and as late as July.

Settlement of post-larvae (approximately 2 cm in length) occurs in shallow seagrass beds within bays and gulfs in winter/spring. These larvae have been drifting in the water column for three to four months before settlement. These juveniles then grow for 3 to 4 years within the sheltered bays and gulfs until they move offshore at about the time of reaching sexual maturity.

The majority of the King George Whiting catch is taken in the bays and gulfs between the times of reaching minimum legal length and the point where offshore migration occurs.

In SA spawning occurs near the mouth of Spencer Gulf and Gulf St Vincent, as well as Investigator Strait north of Kangaroo Island. We know that Whiting in the Victorian bays come from spawning offshore, but we don't know the locations, with some

evidence suggesting they come from spawning in South Australia.

The recent genetic study, conducted over 4 years, was designed to determine whether the management of the King George Whiting fishery was appropriate. It was thought populations might range across State boundaries and need a more integrated approach. There was particular uncertainty about the relationship between Victorian and South Australian stocks.

Movement of juvenile Whiting between bays in Victoria was analysed for juveniles using chemical markers and stable isotope signatures present in the otolith (ear bone), that might show where the fish originally were spawned.

It was found that Whiting in the Victorian and South Australian fisheries come from different spawning areas, and that adult Whiting from Victoria do not migrate to the known Whiting spawning area in South Australia.

The project also identified a previously unknown spawning area for King George Whiting in north-western Tasmania. Three decades ago, King George Whiting were considered to be rare in Tasmanian waters south of the Furneaux group of Islands in Bass Strait. However, in recent years there have been increasing reports of King George Whiting in Tasmanian waters, including a small-scale mesh net fishery for large Whiting on the north-west coast, and recreational fisheries for sub-adult King George Whiting in embayments with seagrass such as St Georges Bay on the northeast coast. Age and reproductive analysis of the population of large Whiting off north-west Tasmania showed that this population included individuals up to 18 years of age, and had a similar age structure the known spawning area in South Australia. Macroscopic and microscopic analysis of gonad development indicated that Whiting were spawning in the area and that the seasonality of spawning was similar to South Australia, with spawning occurring in the autumn months.

The King George Whiting in Tasmania and Western Australia were found to be genetically distinct from Whiting in Victoria and South Australia, suggesting they don't mix across State boundaries. The SA and Vic populations do appear to mix genetically, but this may only be to a small degree.

Victorian Whiting that are the primary target of fishing do not mix between bays and therefore each bay should potentially be managed independently. In terms of the Whiting fishery in Tasmania, managers will in future need to take into account that the north-west coast of the State is a spawning area for the species, and some level of protection for fish in this area, such as closed areas, closed seasons, or maximum size limits may be needed in the future as the fishery develops.



Sandy beaches

About 65% of the Australian coastline is beach and most of us live near one or two. Each beach has its own mix of grain size and exposure presenting different challenges for each species of beach animal.

Sources, Graham Edgar, activeinparks.org



Beach Sand on the Move

Beach sand grains consist of mostly Quartz granules eroded from the rocky coastline or washed down rivers, mixed with the remains of broken shells. They can be transported over long distances before accumulating behind the shelter of a headland and forming a beach, or is the slow points of a channel where it will make a sand bank or cay. The beach sands on the Coast of

South East Queensland originates in the NSW highlands and is transported North by the prevailing winds as far as Fraser Island.

Beach sand is pushed ashore and dries, either to be washed out to sea again, or driven further inland, especially the lighter grains. They build up in summer and autumn and are then often eroded by large storms that coincide with high tide. Some beaches build up massive backing dune systems like at Musselroe Bay (Tas), Shelburne Bay (Qld) or the desert at Eyre in South Australia. Rising sea levels can isolate these dunes as islands, such as Fraser Island and Stradbroke Island in Queensland.



These dunes may be stabilised by hardy plants like spinifex, or even move inland to swallow up adjoining forests. Less mobile dunes are colonised by shrubs, that fertilise the sand with fallen leaves until large stands of coastal heath and even eucalypt forest colonised the dunes. For soil that is so harsh and poor it is amazing that most coastal scrubland is alive with flowers and nectar eating birds. Regrettably much of our coastal heath has been cleared for development and agriculture, or has been

burned out in frequent fires. Even trampling of small sections of vegetation can cause large sand blows that undermine the dunes.



Marine Life

Apart from swimming, surfing and sunburn, beaches also offer fun for the curious and observant. Beachcombers will spot many unusual creatures washed ashore. Some of the most interesting are those that come ashore after offshore planktonic blooms are trapped inshore by a change in the wind. These include violet snails, by the wind sailors, a multitude of different kinds of jellyfish. There are also a variety of shells, as well as fragments of sponge and sea squirts.

As far as marine life goes it can seem like a particularly barren desert with the most visible things being dead seaweed and shells along the high tide line. Anything living on a beach can look forward to being dried out and the wetted, buried and re buried by the tide and waves.

A wave can disturb the sand on the seabed by as much as 40% of its height, a one metre wave can turn over 40 cms of sand. In the tropical North, large tidal ranges and frequent cyclones keep some areas of sandy shallows regularly turned over and often devoid of any bottom dwelling marine life.

Hardy animals have evolved to cope with the tough conditions, but they are generally small and buried out of sight. They burrow down to avoid the wave energy but not too far as many beaches





are oxygen poor at depth. These conditions tend to favour smaller animals like crustaceans and molluscs. Shellfish have a siphon to breathe with and can bury themselves quickly if exposed by the swell. Larger animals like ghost crabs stay buried during the day away from the burning sun. They emerge at night to feed.



The food on beaches is provided by microscopic algae and plankton and by drift seaweed that washes ashore on the high tide. The water in the surf line is surprisingly poorly circulated despite all the wave energy. Plankton

washed inshore is trapped in surf cells where if gets pushed ashore, then sucked out by rips, to be washed in again. This

creates suitable conditions for algal blooms and they can be seen as a light green line of scum on the beach. If nutrients are added from a creek or storm water outfall, then fine red algae can stain the water. Bacteria also coats the sand grains in the upper layers and becomes food for other small creatures.



Seaweed fragments can come ashore in huge banks after a storm. During the day it is eaten by kelp flies and at night swarms of isopods will emerge to devour it. Mostly the size of a couple of rice grains, they are so numerous they can strip a stranded fish carcass in a single night. Other species head out into the water to feed on the seaweed caught in the surge cells. These small animals are a bonanza for fish who dart in amongst the waves to feed in the shallows. This is an important food source of the juvenile stages of fish like whiting and herring.



Shorebirds

In the higher and drier areas shorebirds often nest, particularly birds that can exploit the vast quantities of isopods, kelp flies and shellfish, like Hooded Plovers and Oystercatchers.



Our culture is so fixated with beaches that very few of them are today truly wild any more. Some exceptions are the west coast beaches of Tasmania, and the beaches in our more remote tropical North. Here bird life is largely undisturbed by humans and their cars and dogs. Disturbance of nesting sites has become a significant threat to the survival of these birds. Even the kindest dog will cause birds to abandon nests, or disturb birds while they are trying to feed at critical phases of the tide. Keep your dog down on the wet sand on a lead, at designated dog walking beaches. These days many beaches have signs alerting beach users to bird breeding times, please follow the recommendations on those signs.

A lot of our beaches are also dirty, marred by rafts of plastic debris that washes ashore from nearby cities, or from offshore fishing boats. It is estimated that 600,000 plastic bottles enter the sea every day. Rope and fishing line easily tangles wildlife. The items are often old plastics that have deteriorated into balls called micro plastics. They are easily ingested, especially by seabirds and they can kill.



Kelp Flies

At the beach you might find a sleepy looking fly land on you from some nearby kelp. It is long and skinny and doesn't look much like a house fly. These Coelopid kelp flies might irritate sunbathers but they are entirely harmless and also very important vegetarians.

Photos Brad Schram, Rudolph Meier



They settle in large numbers on any kelp that has washed ashore, especially in summer. They have a small meal, socialise, then one thing leads to another and they soon plant their eggs deep into the seaweed tissue.

The kelp fly adults don't really do much else and just hang around, soon attracting plenty of predators. They are snapped up greedily by seabirds. I have also seen swarms of European wasps lining up to rip them limb from limb, but the kelp flies don't even bother to get out of the way. Perhaps because they have fulfilled their purpose by breeding, and don't have access to Prozac, they just don't see the point in going on any longer.

If the adults are a bit wimpy and depressed, the larvae are go getters. They may eat 14.7% of the dry kelp by mass on a beach within a week, amphipods knock off another 52.7%, quickly clearing up the beach for all those sunbathers complaining about the smell of rotting seaweed.

The pupae then fall into the sand where they are kept warm by the decaying kelp. In winter, bacteria can raise the temperatures

in otherwise frozen wrack heaps by as much as to 20-30 °C. Larvae can even survive for up to 6 days in aerated water, which helps them endure intertidal life and even a short trip out to sea if they get washed away. A ring of unique gill-like hairs aid their respiration while they are submerged.

They are so dependent on kelp that when beach wrack is in short supply, their numbers suffer. This might happen when climate change reduces giant kelp or Bull kelp gardens in an area, or causes urchins to eat out kelp. In turn this might affect the numbers of shorebirds.

Thirteen species are recorded in Australia, more than for any other country, including two species found on Macquarie Island. A few Australian species are also found in stranded seagrass.

When they get together in big swarms they tend to catch every little disease going around (none affecting humans), but they are very disease resistant. *Stigmatomyces* fungus attacks 18% of adults but even fungus-ridden adult flies survive and behave normally. Kelp fly virus can be isolated in the lab. Here is how you do it.

Catch about 2 million fly larvae on the rocks and put them in a blender, then inject them into the grubs of waxmoths. The virus was harmless to kelp flies but made a mess of moth grubs within 4 days. These moths attack bee hives, and experiments like this might lead to new toxin free pest control measures in agriculture.



Aren't they cute little cherubs, an electron microscope picks up the 'face' of a kelp fly larvae

Shocking Swimwear

Sources; *Surfs Up! The History of the Australian Beach*, Aust Govt,



Most of Australia's population lives close to the coastline and the beach. The Coastal Studies Unit at the University of Sydney has counted 10,685 beaches in Australia. There are no privately-owned beaches in Australia, with the Crown owning land generally up to the high tide mark.

Many people live close enough to a beach to visit regularly, and others use the beach for annual holidays. The leisure industry is a major employer of people along Australia's coastline. Coastal sight-seeing is a very popular pursuit for Australians and international tourists. Australia's more famous beaches include Bondi and Manly in Sydney, St Kilda in Melbourne, Surfers Paradise on the Queensland Gold Coast, Cottesloe in Perth, Bells Beach in Victoria and Glenelg in Adelaide.

For tens of thousands of years Aboriginal and Torres Strait Islander peoples have fished the coastal waters. In the early 1800s convicts were banned from bathing in Sydney's harbours and beaches due to the dangers of sharks, stingrays and "for reasons of decorum." From 1838 sea bathing was officially banned between the hours of 9.00am and 8.00pm due to decency and morality laws.

Going to the beach as a mass leisure activity was pretty much unheard of before the early twentieth century. One would go to the seaside to escape the city, to take in the air and to stroll along the promenade. By the mid-1800s Bondi beach was a favourite location for family outings and picnics, with the first tramway reaching Bondi beach in 1884.

By the late 19th century the beach had become a common subject in Australian painting. Tom Roberts's *Slumbering sea, Mentone* and Charles Conder's *Sketch of Littlehampton Beach* were among the earliest depictions of beach life in Australia. These works show variously the worship of the sun and the beach by some Australians, as well as a place for family activity and recreation.

The main attractions were located on man-made 'pleasure piers' that contained amusements, shops, restaurants, and even concert halls and theatres.

These piers continued to be used into the early twentieth century until most were weak with rust and were destroyed in storms.



At the turn of the century many started to rally against anti-bathing laws. In 1902, William Gocher swam at Manly beach during daylight hours in protest and was not arrested. By 1903, laws were relaxed and Australians were finally allowed to enter the water at the beach during daylight hours.



One of the reasons why bathing was shocking probably was that adequate swimwear did not exist. Women's 'bathing suits' had been around since the late seventeenth century, but they were bulky and heavy, dangerous in surf. Australian swimmer and diver Annette Kellerman championed the one piece swimsuit and was arrested for public indecency at a beach in the USA. Men on Australian beaches were also criticised and sometimes arrested for their choice of swimwear.

A mother, wrote in a letter to the editor of the Sydney Morning Herald in February 1907 that she was forced to leave Balmoral beach with her daughters due to

the "sprawling men and lads, naked, but for a nondescript rag around their middle."

Similar debates raged throughout the 1920s and 1930s, but more and more flesh was starting to be revealed. The first bikini emerged just after WWII. Men also started wearing trunks. Moralists thought the bikini of the 1940s and 50s was shocking but swimwear got smaller, until the same moralists would argue that there is hardly any left at all.

Australia's top 10 beaches (according to Brad Farmer)

1. Cossies Beach, Cocos (Keeling) Islands, Indian Ocean
2. Nudey Beach, Fitzroy Island, QLD
3. Moonee Beach, Coffs Coast, NSW
4. Turquoise Bay, Coral Coast, WA
5. Burleigh Heads, Gold Coast, QLD
6. Maslin Beach, Adelaide, SA
7. Dolly Beach, Christmas Island, Indian Ocean
8. Shelly Beach, Nambucca Coast, NSW
9. Boat Harbour Beach, North West Coast, TAS
10. Apollo Bay, Great Ocean Road, VIC

Banded Stilts visit Tassie



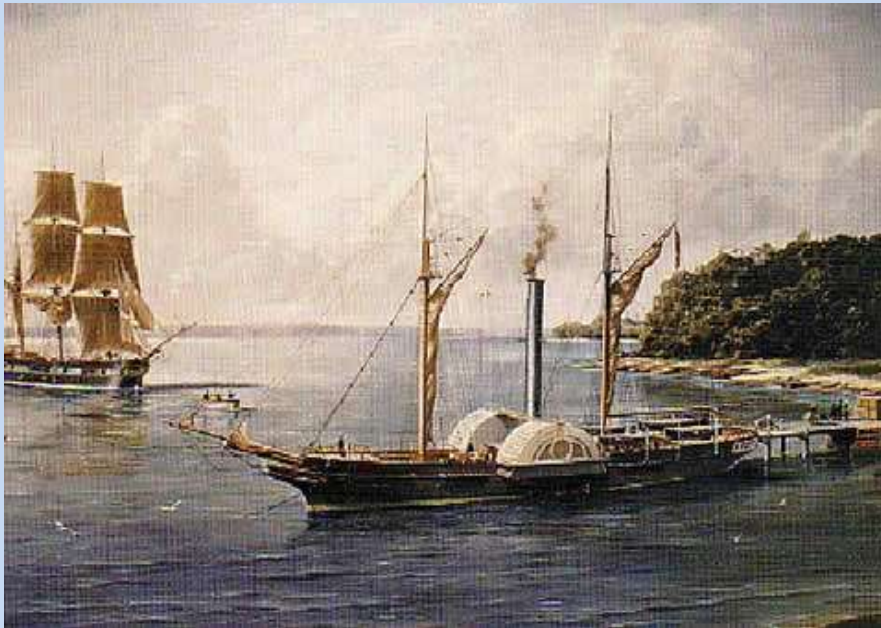
Source Dr Eric Woehler, *Bird Life Tasmania*

One of our most handsome endemic waterbirds, the Banded Stilt sometimes forms vast flocks that comprise hundreds of thousands of birds. Banded Stilts breed

only in the arid inland when wetlands appear after rain or flooding and not much is known about their breeding habits.

Banded Stilts feed on crustaceans, molluscs, insects, vegetation, seeds and roots. They forage by picking, probing and scything (swinging bill from side to side) on salt lakes, either by wading in shallow water or swimming often some distance from the shore.

Tech Revolution - Early paddle steamers And their side lever engines



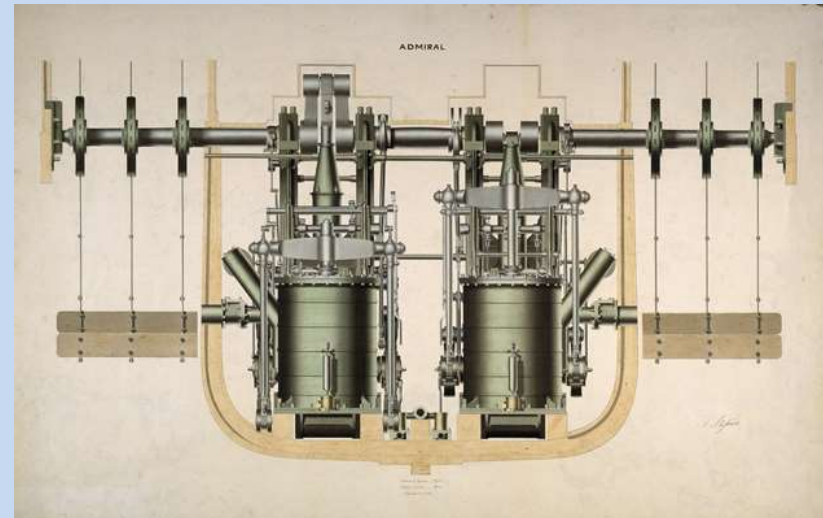
Primary Sources NLA, late J.Riley

The big 'tech revolution' in Australia was arguably not the mobile phone or the internet, but the arrival of marine steam engines.

Steam engines had been used on land for pumping out mines and other uses since 1712, but they were huge, heavy and low powered. It was nearly a century before they were successfully adapted for use in ships.

The steam engine improvements made by James Watt in the later half of the 18th century greatly improved steam engine efficiency. William Symington built the world's "first practical steamboat", the *Charlotte Dundas*, in 1802.

They were pretty crudely engined. Most were just downsized land engines placed in sailing ship hulls, even though a steam engine could now sail directly into the wind, meaning that waves would more often sweep the decks. They also pitched and rolled appallingly without a hull redesign. The engines were also unreliable due to poor strength of metals. Boilers could not be highly pressurised without exploding, meaning that the engines lacked power and chewed up excessive quantities of coal. The heavy and big engines also reduced cargo space. Development of the screw propeller also lagged behind. Most early vessels were small and ungainly paddle steamers.



These early paddle steamers were powered by side lever engines, which were a development of a land based steam engine developed in 1791. They are the earliest type of marine engines used in Australia.

Power was transmitted from a vertically placed cylinder to the paddle wheel shaft via rods and levers. These distinctive side levers gave the engine its name. The levers were mounted low to keep the engines centre of gravity down. They were a slow revving engine suitable only for paddle wheel use. They were jet

condensing engines which ran using steam generated from seawater. The engines had lots of moving parts requiring constant lubrication and maintenance. The heavy coal use meant constant hard labour on a shovel in a stifling furnace room. Teams of marine engineers, trimmers, firemen and stokers became a new and indispensable part of the crew.

Most early steamers were underpowered largely due to their weak Box Boilers. These early and crude boilers were expensive to build because they required heavy internal staying across all three planes to maintain rigidity. They produced a low boiler pressure of 15 - 25 p.s.i. (your rubber car tyre will take 40 psi). The need to use large quantities of water, salt water on ocean voyages or in arid areas, meant that the boilers were a maintenance headache. The boilers had to be regularly cleaned out internally and they also rusted away after a few years.

The first successful transatlantic crossing occurred in 1819 and a regular transatlantic service was operating by 1838. The steamers were great as tugs, pulling becalmed ships around safe harbours, and as ferries or short-haul coal carriers, but they were no good for long sea voyages.

In an age of seemingly bewilderingly fast technological development, many old shipowners were reluctant to risk money in these loud, inelegant and grimy new contraptions. As is still the case today, a proportion of shipowners also had to have the latest and greatest, no matter how expensive, which provided enough output from the new foundries and shipyards to keep the technology alive.

Paddlers in Australia

Out in Australia, isolated as we were, we needed visible signs that we were keeping abreast of "Mother country's" great new advances. The two largest settlements in Australia at the time were Sydney and Hobart and they were the focus of keen interest in steamer services. English shipowners tried to send

steamers (usually the less successful ones) out to the colonies at a huge markup. Shipyards also sold engines and metal frames in "kits" to be assembled by enterprising colonial boatbuilders.

1831 was a big year for steamers in Australia. The paddler "Sophia Jane" arrived from England, the "Surprise", had just been launched by Smith Bros, at Neutral Bay NSW. Mr. Grose was already building a steamer "William the Fourth" at William's River NSW. Another steamer "Governor Arthur" was in an advanced state on the stocks in Hobart.

Surprise – Australia's first steamer

The "Surprise" was the first Australian built (assembled actually) steamer, a small 58ft long paddler owned by Mr Gilbert. A ten horsepower 'high pressure' steam engine was probably imported from the UK. On her first voyage up the Parramatta, the paddler got stuck on the mud. This capped off an indifferent first trip where it was also noted that she was "rather top-heavy and rolls to an unpleasant degree". Things didn't improve and 9 months later she was sent to Hobart under sail. Dr Alexander Thomson had laid out the massive sum of £4000 for her and used her as a ferry on the Derwent with mixed results. She worked the Hobart - Kangaroo Point Tasmania ferry service, at times taking in New Norfolk. In 1841 her boiler exploded due to alleged sabotage, killing a crewman. Then her engines were removed and she was equipped with sails.

As a topsail schooner, she traded between the Channel Ports and Hobart for a few years under her original name. Later went to Melbourne after being renamed *Anna Jane*, then she became a 'lighter' until eventually broken up. Her old boiler was used for a time in Gibson's mill at their Sydney Wharf and, afterwards, sent up-country to one of the mines. There are no surviving drawings of Australia's first, and perhaps most unsuccessful, steamer.

Sophia Jane (and her rare surviving engine)

Considered the first steamer in Australia she arrived (under sail) in Sydney on 14 May 1831, just as a locally-built steamer had already taken to the water, so even this accolade may not be technically correct [OK, I'm comfortable with pedantry].



The steamer was built in 1826 by Barnes and Miller at Rotherhithe. Barnes and Miller were the only pupils of pioneering engineer James Watt and carried on his work after his death in 1819. She was a large steamer for the time of 256 gross tons and 120'3" in length. She was equipped with a side lever jet condensing type engine making 50 horsepower. Two new spare boilers were also made for her and shipped out later. This was essential as the lifetime of the early flue type boilers was only three to seven years. She was sent out to the colonies under sail in the hope that she would find a premium buyer.

The *Sophia Jane* commenced in the coastal trade between Sydney and Newcastle. She was considered very fast and could travel the 100 kilometres between Sydney and Newcastle in eight hours. In November 1833, J H Grose purchased all the shares in the vessel and ran her until 1840. She changed hands many times and was regularly plying between Sydney and Wollongong.

In 1846 her engines were transferred to the newly built paddle steamer *Phoenix* and the tired old *Sophia Jane* hull was broken up. The *Phoenix* was built in that year by Thomas Chowne at Pyrmont for Edye Manning. The vessel was engaged in the service between Sydney and the Clarence River.

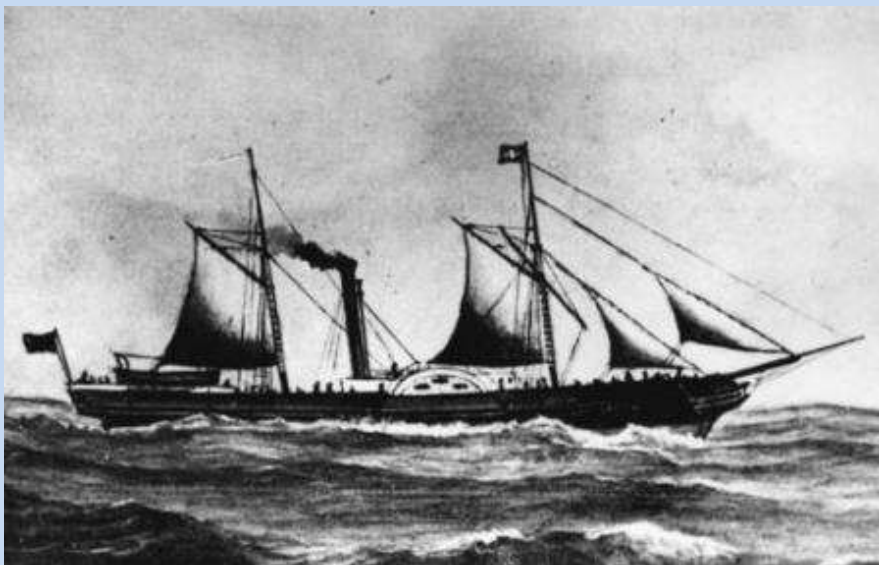
In 1850, the "Phoenix" was ashore south of Angourie. The old engine was removed, her hull refloated and she sailed to Sydney for repair. In 14/4/1852, the "Phoenix" was again wrecked while attempting to cross the bar. This time there was no escape and she broke up. Thirty-two years later her engine was uncovered during a heavy south-east gale on the north side of the river. The remains of the rare engine are still buried in sand on the beach at Iluka. She has the oldest marine engine in Australia that is known to still exist.

William the Fourth – ocean steamer

She was the first ocean-going wooden steamship built in Australia. The hull was built by Marshal and Lowe. Mr. Patterson assembled her machinery from imported parts manufactured by Fawcett of Liverpool. She was 80ft; long and only 25 tons and schooner-rigged. "Thus, Mr. Editor, you see that this colony can now boast of being able to build her own steamers, and these with her own indigenous timber..." Mr. Grose of Parramatta, was the shipowner. Grose controlled a large part of the Hunter River steam trade during the 1830s.

In 1853 she was lengthened to be 77 tons. In 1864, she was sent abroad to China and operated by A Ellissen & Co., on the

Shanghai - Ningpo route. She was laid up towards end of December 1868 and then sent to Japan. At that point her record goes cold.



King William the Fourth - more buried engine relics

Confusingly J H Grose also owned another steamer with a similar name. She was built in 1830 by an unknown yard at Blackwall London, and equipped with a 70 horsepower engine. She arrived in Sydney in January 1838 and was placed on the Sydney - Hunter River trade. She was found to be too 'light' for the heavy open seas.

She was wrecked on June 2 1839 in stormy weather after going ashore at the entrance to Newcastle harbour. She lost none of her 76 compliment passengers thanks to the lifeline taken out to the wreck by the Harbourmaster. This engine was salvaged and placed in the steamer 'Sovereign'. The 119 ton, 111'2" in long two-masted schooner-rigged wooden paddle-steamer

"Sovereign" was built by Chowne and Thompson at Pyrmont, Sydney in 1841. The engine was then recorded then as a 2 cylinder 35 hp engine. On 11th March 1847, she was wrecked in a gale on the bar of the South Channel of Moreton Bay, Queensland, whilst steaming from Brisbane to Sydney. From Brisbane to Sydney, wrecked in a fierce south easterly. Forty-four lives were lost, only ten survived.

The secretary to the Hunter's River Steam Navigation Company was accused of letting her become unseaworthy and replied that "...she had been repaired a few months before; her engines and boilers were then taken out of her, the engines were re-fitted on shore in the same thorough manner. Additional strength was given to many portions of the machinery, and the boilers were also repaired at the same time. The cost of the repairs to the Company was upwards of £2000". This was stridently contradicted by the captain, and it seems that her engines did break down while passing over the sand bar. "The Captain states there was no wind at the time the engines broke down; that he let go the anchors, notwithstanding which the rollers bore her rapidly on the spit, about four miles distant from Moreton Island, where she became a complete wreck in a very short time". The survivors owed their lives to the efforts of a group of Aboriginal men from Quandamooka (Moreton Bay) who put their own lives at risk in extremely dangerous conditions to swim out to the wreck and pull the survivors back to shore.

As far as we know the old engine is still buried there, but the exact wreck site is unknown.

Governor Arthur - Tassie's first locally built steamer

In 1832, Dr Thomson built his own steamer at Hobart, the 63 foot paddler "Governor Arthur". Her 14 HP engine was sent out from England (later rated at 25HP probably due to boiler improvements). Plans for two more ships seem to have been shelved, and it looks like the powerplant was no great success. In 1834, a larger piston was cast in a Hobart foundry to try and improve performance.

"Capt. Wilson's new steam engine for the Governor Arthur steamboat, is, we are happy to observe, nearly finished, his new foundry answering every expectation... it is calculated that it will travel about 9 miles an hour..." His foundry was in the back of Campbell Street.

She was a regular trader on both the Derwent and Tamar River, although she had to be renamed "Steam Packet" while operating on the Tamar, as Governor Arthur was very unpopular there. In 1840 she went to Melbourne and was the second steamer to operate on the Yarra. She worked alongside the "Corsair" and "Seahorse", mainly taking cargo to Hobsons Bay. In 1841 she caught fire at her wharf. She had to be scuttled to save her. An attempt was made at patch repairs,

"On inspecting the boiler and engines, it was found that the latter could be repaired, which has saved an expense of £400, the value of a new one, which was about to be ordered from Hobart Town: strong iron plates have been bound on the damaged parts, and are calculated to render the apparatus serviceable for the next two years."

She did not make a profit though and around 1845, the engines were sold, refurbished and relocated in to the "Diamond" (completed in 1847 and the first steamer built on the Yarra). She traded for many years on Hobsons Bay but her eventual fate is unknown. The Governor Arthur's hull was re-rigged as a schooner. Later the schooner went to New Zealand (after 1848) where she was later broken up at Otago.

Karuah - dud steamer

On 30th November 1831 at Carrington, the Australian Agricultural Company steamer 'Karuah' was launched. She was apparently a failure and she was not considered as capable as the other local steamers of the time. Her owner noted "Our little steamer got under way today for the first time and paddled about the harbour. I cannot yet say much for her success, but everything is stiff and new and we hope to be able to improve her. I do not think she went above three knots." This suggests a very low-powered engine and boiler. She is not mentioned of again in any newspaper accounts and may well have been scrapped a short time later.

Ceres (and Victoria)

The Hunter River Packet Association was formed in 1834 to provide competition for the *Sophia Jane* and the *William the Fourth*, then trading between Sydney and the Hunter. A meeting had been held in April 1833 when it was decided to build a 200 ton steamer in New South Wales to be fitted with two 40 horse power engines. Mr. Lowe of Clarence Town tendered to build the ship. When the machinery had arrived in 1836 it was fitted in the newly built vessel.

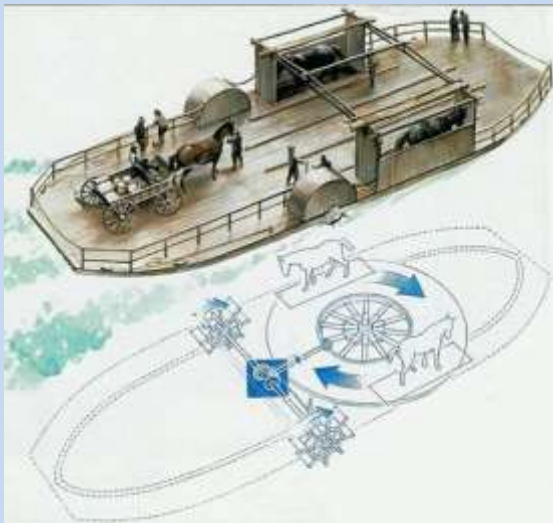
Unluckily, the Ceres was wrecked six months later and the company was wound up. *The wreck* was sold as it lay at Cabbage Tree Bay near Sydney. It was purchased by John Korff (Coff's Harbour is named after him) who, with primitive appliances, raised the engines. Wreck and cargo were floated to the shore with the aid of pontoons and a bullock team. He salvaged the timbers and from them built a 49-ton cutter *Rover's Bride*. The engines were installed in a 270-ton paddle steamer he was building at the slipway on his farm at Miller's Forest on the Hunter. His new ship *Victoria* "won great praise for the design which enabled her to cross the shallow Hunter River bar and for her strength and sailing qualities". The *Victoria* carried

passengers and cargo between Newcastle and Sydney for several years.

The only relic of the "Ceres" is a ship's bell used in a small church in Raymond Terrace. The "Victoria" was sent to China eventually and was still trading there at the turn of the century.

Experiment – in horse-power, literally

While the colonies were in awe of new steamship technology Marshall and Lowe were completing a small vessel with a very novel 'engine' for Benjamin Boyd. The "Experiment" was a paddler, but entirely driven by horses on a treadmill. The small 37 ton 79'8"foot long horse-powered paddle steamer was not a success.



In 1834, she was sold to Mr. Edye Manning who installed a 12 hp steam engine. She worked at Parramatta from 1835. In June 1846 she was sent to Moreton Bay and was also claimed to be the first steamer to ply on the Brisbane River. She plied as far as Ipswich (in the Bremer River) until foundering alongside the Queen's Wharf in January 1848.

She was raised and later broken up, although her engine and boiler were salvaged and installed in the 85 ft long steamer "Hawk". She was built in 1849 in South Brisbane and was abandoned in the Mary River in Queensland in 1877. She had by

then given up her engines to the steamer "Hercules", but the engines were inadequate and later replaced, we don't know if they were scrapped or further reused. The Hercules was wrongly claimed to have been built as a Confederate gun boat.



Great white shark cam gets Crowd Funding

Researchers in South Australia are attaching cameras to great white sharks, or they will with the right funding.



Dr Huveneers attaches a camera to a great white shark. (Andrew Fox)

The hope is to catch hunting behaviour on film, but money is tight. Dr Huveneers said modern-day research funding had become harder to come by, so the university was trialling crowdfunding to cover the costs involved for the project. The university hoped to raise \$20,300.

Supporters will be given the option to join Dr Huveneers on his research missions.

"Funding is quite competitive and there are less and less funds available, so we are always trying to find new ways to seek funds," Dr Huveneers said.

Freaks! Hooded sea slugs



A bizarre translucent sea slug is prowling the seas of Australia, and they have some pretty strange behaviours.

Melibe is a type of nudibranch - a marine snail that has no shell. Nudibranchs come in many shapes, sizes and colours, are often a bewildering display of bright primary colours. Melibe is instead a bit of a 'stealth' version, almost invisible to all but the most observant diver.

They stand out due to the large oral hood, which is used to trap amphipods and other tiny shrimp-like creatures living among the weed.

Some species have appendages on the back. When it is attacked by a predator, such as a crab, it can shed these plates just like a lizard. Muscles contract strongly and put tension on this plane. The granulated material is released, breaking down connective

tissues. The sphincters then contract to close the wound, preventing the hooded sea slug from dying.

University of Victoria developmental biologist Louise Page said, 'I've often wondered if the cerata may be acting as a decoy, to attract the first attack from a fish or a crab, to deflect it away from the hood, because the oral hood is so vulnerable,' she said.



They collected Melibe eggs from their natural habitat and hatched and cultured larvae in the laboratory.

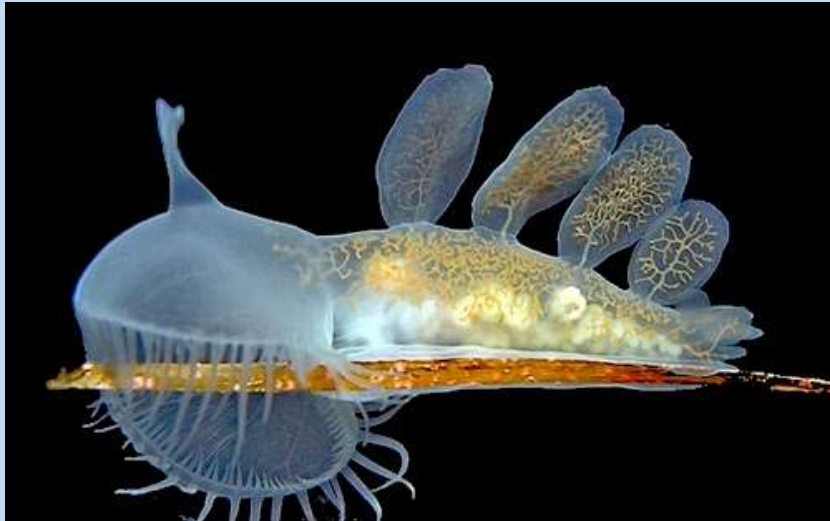
Once they reached the correct developmental stages, Page's team used special stains to identify nerves and muscle tissues in the autotomy plane.



They discovered that while the granule-filled cells are already abundant before the stage where self-cutting is first exhibited, the sphincter muscles first develop at this stage.

This suggests the muscles are critical to the autotomy process.

She intends to continue studying the strange creatures and believes their mechanism may lead to breakthroughs in helping wounds to heal.



Melibe leonina (an American species) also has a sweet fruity aroma which you can smell throughout the room when a number of them are in a tank. It tends to 'get to you' like a bad perfume. They are gregarious animals and probably use it to keep together." Said researcher Sandra Millen. Apparently other species of nudibranch can give off a lemon scent.



Australia also has its own hooded slug species. This *Melibe maugeana* was collected in the Eyre Peninsula, in South Australia by Sabine Dittmann of Flinders Uni.

Sexy Climate change

The plant-eating amphipod, *Cymadusa pemptos* will boom under changing climate conditions.



Males have larger claws than females, which are used as a display to attract females or a weapon to fend off other males. Studies indicate that as waters are warmer, the males are growing bigger and getting larger claws.

"It seems that sexual selection for this attractiveness trait could mean that every male was equally attractive to the females, resulting in very large numbers of females – almost 80% – becoming pregnant, causing a massive population explosion."

Because the future climate change conditions also promoted increased growth of the marine algae which amphipods eat, constraints on competition for food were removed, allowing males to support their energy-demanding bigger claws and enabling the population to grow.

"We know that climate change will be cataclysmic for many species but in some cases it will not," says Dr Munguia. "This is the first quantitative example of how it will be beneficial for some individual species, albeit with massive consequences to the environment overall.

Raine Island , Natural Wonderland



This special island is a vegetated 32 hectares coral cay on the outer edges of the Great Barrier Reef. It is a turtle and seabird hot spot. But it needs help.

Raine Island lies 620 km north-north-east of Cairns off the tip of Cape York. The cay is composed of a central core of phosphate rock surrounded by sand and extensive fringing reefs. It lies close to the continental shelf, next to a shipping channel known as the Raine Island Entrance and Pandora Entrance. The entrance allows shipping to enter the Great Barrier Reef.

The waters around the island were treacherous for early European navigators. More than thirty shipwrecks can be found off the coast of the island including HMS *Pandora*. Raine Island is marked by a stone beacon built in 1844. During the 1890s, the island was mined for guano.

In August 2007 Raine Island, along with the neighbouring Moulter and MacLennan Cays, was proclaimed the Raine Island National Park (Scientific) and usually totally closed to public access. The declaration was made possible by the Wuthathi people and interested Torres Strait Islanders entering into a special Indigenous Land Use Agreement with the State.

Raine has the world's largest remaining population of green turtles (*Chelonia mydas*). Up to 18,000 females nesting on the small coral sand cay in one season. The nesting site has been active on the island for more than 1,000 years.

Every year from late October to February egg laden females arrive from many parts of northern Australia, eastern Indonesia, Papua New Guinea, Vanuatu and New Caledonia. (as much as 2700km away). They crawl up the beach at night lay approximately 100 eggs each. They are generally expected to do this 4-6 times in a nesting season and then not return again for the next two to six years.

It is also considered as the most significant tropical seabird breeding site in the Great Barrier Reef. 84 bird species have been observed on the island.

Recent monitoring and research at the island indicates that successful incubation rates of green turtle nests is well below what might be expected. Their breeding rate on the island is a very low 20 per cent, well under the sustainable rate of 85%.

Tidal inundation is one of the issues. As sea levels rise, nests are being flooded and banks eroded away, until they become a trap for breeding turtles. Researchers have been reshaping parts of the beach to protect breeding grounds.





In a Queensland first, drones are being used to collect data. "They will also provide for far more efficient and accurate topographic mapping, which will be crucial in keeping track of the ongoing changes to the sand profile of the island's nesting beach."

"A weather station, tide and wave recorder and nesting depth sand temperature and water inundation sensors are being used to monitor the physical turtle nesting environment," he said.

Raine Island Recovery Project Manager and turtle researcher Dr Andy Dunstan said early results of the topographic mapping were showing that the reprofiled area of beach was maintaining itself and resulting in more hatchlings being produced.



The Raine Island Recovery Project is a five-year \$7.95 million collaboration between the Queensland Government, BHP Billiton and the Great Barrier Reef Foundation, and the Wuthathi and Meriam Nations Traditional Owners.

Queensland National Parks Minister Dr Steven Miles said the "bold conservation project" had kept the beach stable and turtle eggs safe.

"When I met with David Attenborough last year for the release of his documentary, he said it was one of the most amazing places in the world he had been — and that's a pretty exclusive list," Dr Miles said.



Twit of the Month

There is one thing more stupid than taking a dinghy out to solo-dive the Yongala, that is Pauline Hanson's visit to a healthy patch of reef in the southern GBR to deny climate change.

Photo Dan Peled

Hanson and other One Nation senators went to Great Keppel in the southern GBR to show of support for Queensland's tourism industry. As readers will know the damage done by the 2016 warming event was all north of Cairns, 1000 kilometres from Great Keppel.



Senator Hanson disputed claims from the world's leading scientists that the reef experienced its worst ever bleaching event in 2016, "If you actually go deeper, 12-20 metres deeper in the ocean, the reefs there are in pristine condition," she said *[so she snorkelled 20 metres on her first effort - well done, I thought she floated around on the surface and had stuff brought to her]*.

Senator Hanson is also not convinced that global warming contributed to this year's bleaching event that wiped out about 22 per cent of the reef's coral.

"We can't have these lies put across by people with their own agendas," she said.

Mad and sad. Next she will be going to Indonesia to study trade with China, or France to deal with indigenous affairs. I'd hate to see this sort of person wandering aimlessly in the streets when

she belongs in some kind of institution. Luckily she is in Parliament where this sort of witless raving appears to be tolerated, and even rewarded.

[p.s. I was thinking of twit of the year, but there is likely to be way too much competition.]

GBR could be on the UNESCO "in danger" list, Qld Government says.

The Qld State Government warns of GBR status downgrades and foreshadows an election pitch for more powers to save the GBR.

The United Nations Educational, Scientific and Cultural Organisation has just received the joint State-Federal Governments' report on the state of the reef. The report said 32 of the plan's 151 actions to improve the reef by 2050 have been achieved. Another 103 are underway, three are delayed, and 12 are not yet due.

The Queensland ALP Government said it is struggling against opposition to satisfy UNESCO and not have the GBR on the danger list. "Of course since then we have had the catastrophic bleaching event, as well as failure of Queensland Parliament to pass the land clearing laws. So those two things together increase the risk there will be that level of attention." They also admitted that the prospects of going on the list were actually low, but called on voters to grant an ALP majority at the next election to pass the clearing laws.

Being on the 'in danger' list has its plusses and minuses. The WHC can allocate funds to help or will encourage donor agencies to help financially. But it's also a first step in the potential removal of a site from the World Heritage List which would damage tourism.