MARINE Life

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Our Goal

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

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Cover photo, Andrew Newton, happy wrasse

We are now part of the wonderful world of Facebook! Check us out, stalk our updates, and 'like' ourpage to fuel our insatiable egos.

Contact us: marinelifetassie@gmail.com

Distracting internet cat story -Kitty mouth to mouth

Per ABC News

An Italian coastguard has successfully given CPR to a "motionless" kitten which was pulled out of the Mediterranean Sea.

A group of children notified the Italian Coast Guard after spotting a kitten floating in the water near the port of Marsala in southern Italy.

According to the coast guard's Facebook page, a crew member dived into the water and retrieved the "lifeless" cat before performing mouth-to-mouth and gentle chest compressions.

After a few minutes the cat began to expel water and finally let out a faint meow.

Once the boat returned to land the cat was checked by a vet, who declared it to be in good health.

The coast guard adopted the lucky kitty, naming him Charlie.

It was a break from rescuing immigrants from overcrowded boats, 300 drowned in just three days in May.

English Channel by Bicycle

A couple of French engineers have home-built a pedal-powered sub to dive across the English Channel

Pilotfish may be the smallest long-range autonomous submarine ever built. They are planning to cross the 250kms from SW England to St Malo, one of the world's most crowded shipping lanes.

They plan to travel deep, photographing the bottom to raising awareness of the marine environment.

Cold War Relic Hotting Up

Per ABC News

Global warming could release radioactive waste stored in an abandoned Cold War-era US military camp deep under Greenland's ice

Camp Century was built in north-west Greenland in 1959 as part of US research into the feasibility of nuclear missile launch sites in the Arctic, the University of Zurich said in a statement.

Staff left fuel and an unknown amount of low-level radioactive coolant there when the base shut down in 1967 on the assumption it would be entombed forever, according to the university.

While the waste is currently about 35 metres underneath the ice, the part of the ice sheet covering the camp could start to melt by the end of the century, based on current trends, the scientists said.

"Climate change could remobilise the abandoned hazardous waste believed to be buried forever beneath the Greenland ice sheet," the university said, of findings published this week in the journal Geophysical Research Letters.

Dive Resort won in Raffle

A 26-year-old accountant from New South Wales has won an entire Micronesian tourist resort in a lottery.

In a successful attempt to raise more money, the owners of the 16-room Kosrae Nautilus Resort in the Federated States of Micronesia, put the resort up for sale by raffle. The resort is debt-free, profitable and has more than 20 years left on its lease.

Joshua told Pacific Beat he was in shock when told his ticket was the winner.Joshua said he was now contemplating what his next steps would be.

As an aside, Micronesia is one of the countries in the world most vulnerable to sea level rise.

Enough distraction, back to Armageddon…Climate Change Essentials

It is something we can't see, or smell. We may not be able to notice any visible problem in our own backyard for many decades yet, but we need to realise the full cost of CO2 emissions from fossil fuels VERY SOON, as the bill for the arrears is on its way.

The sun provides this planet with energy, but nowhere near enough to prevent the earth from being a frozen lump in space, an ice world not unlike the moons of Saturn.

Life is possible because a shield of CO2 stops the energy from the sun that hits the earth from escaping back into space. It's our invisible little blanket.

Throughout the history of the planet, the CO2 layer has varied, and our climate frequently changes. In our lifetimes, the planet has been in a 'sweet spot', the CO2 layer is not too thin and not too dense. This allows a huge diversity of living things to flourish from the vast swarms of plankton that whales eat in Antarctica, to the huge fields of crops that are adapted to our current climate and keep us alive.

CO2 can naturally enter the atmosphere from processes like volcanos. Plants suck this CO2 out of the atmosphere and then store the carbon in their stems and leaves, and also let out oxygen. This has kept the world a pretty nice place to live for a long time.

About 300-350 million years ago the earth was mostly ocean with lots of shallow swamps full of ferns and other early plant life. The CO2 concentrations were 1500ppm, about 4 times more than today and the earth was hot, about 10 degrees Celcius higher on average. There were no humans or dinosaurs, the land was ruled by plants and giant insects. So much plant life was growing and sucking up CO2 that 50 million years later the CO2 levels fell to almost the same as current levels. The big decaying mats of swamp plants were squashed by geological forces into a gooey liquid (oil), or a soft rock (coal). We call these products fossil fuels, as they are literally the fossils of these prehistoric plants.

Humans much later discovered that when they burned a tree they could release a hundred years worth of the sun's energy stored as wood. This could heat a cave and fry meat. It allowed us to multiply and grow big brains. When we found coal, millions of years of energy could be released instantly, enough to melt rocks and make iron and steel. By burning oil, we have also been able to 'bring to life' the steel parts of a complex array of new machines that we now rely on.

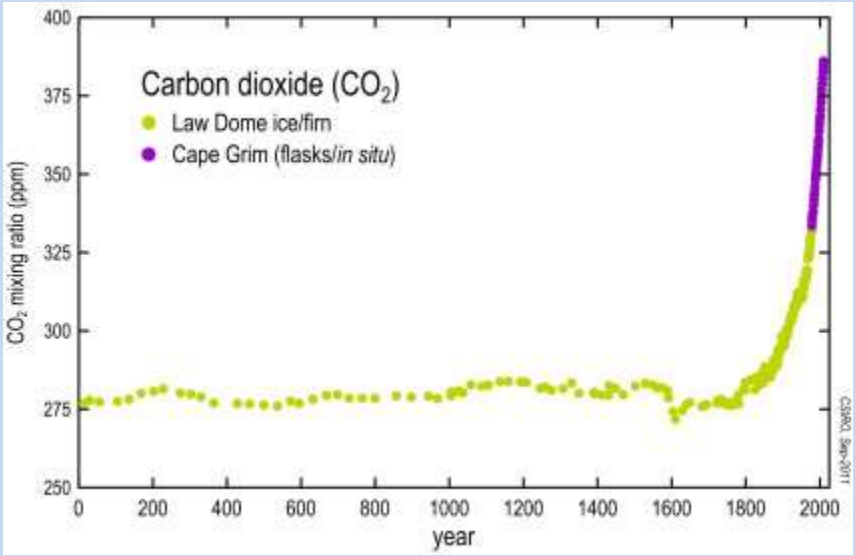
Unfortunately, this burning also releases millions of years worth of carbon from 350 million years ago, in the form of carbon dioxide gas. Our planet's little CO2 blanket is getting denser and

our planet is warming. Our atmosphere is heading back in time to what it was like hundreds of millions of years ago.

The science of this isn't too hard, we can detect CO2 levels with scientific instruments, and gas bubbles trapped in Antarctic ice allow us to map the CO2 history of the planet.

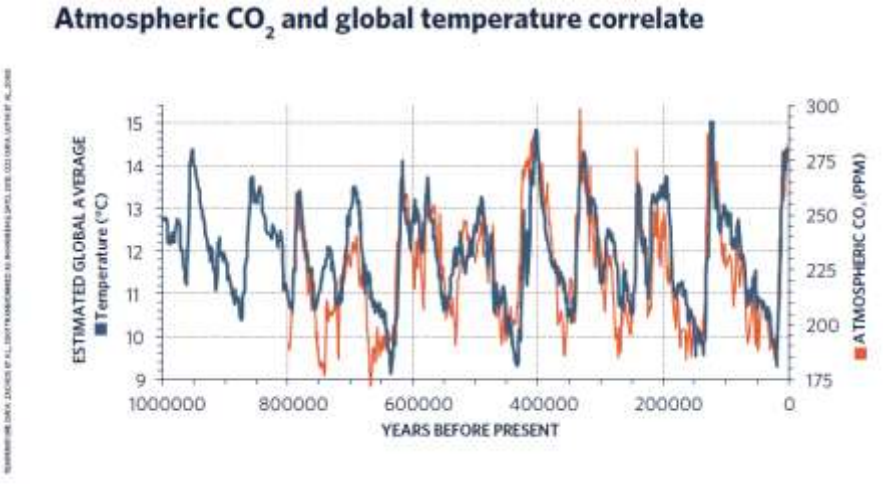
While CO2 emissions have always happened naturally, this stable rate of release changed dramatically when we learned how to use fossil fuels. Now we are supercharging the atmosphere.

Every year the earth naturally pumps out around 500 million tons of CO2 from volcanoes. That is less than 2% of the amount that is being pumped out by humans every year. Australians alone produces 409 million tons of CO2, China produces 10,540 million tons, the USA half of that. A vent in Hawaii (Pi'u O' o) emits 3.3 million tons annually, about one sixth of Sydney's human output. You can't see or smell CO2, so try to imagine Sydney or Melbourne ringed by 6 Hawaiian volcanos instead.



Source;CSIRO

A review of the recent geological record (the last 800,000 year) shows that the recent very extreme CO2 concentrations are new. What is also new is that these extreme increases have occurred in a few decades, not in thousands of years. One estimate says that CO2 emissions are occurring at a rate 60 times faster than normal.



Using indicators of what temperatures may have been in the past, and without using any fancy modelling, there seems to be a direct relationship between CO2 and the earth's temperature (There is fancy monitoring too and that says the same thing). The temperatures in the past are worked out using things like, tree rings, coral specimens and pollens in sediments. CO2 is up and our planet is getting hotter.

When Vikings found pastures in Greenland and Romans grew grapes in the England, the North Atlantic and parts of Europe were warmer than they are today. However, the current changes are not normal cyclical events. The Medieval Climatic Anomaly was localised, other areas of the planet were colder at the same time. What we are talking about now is something global, way bigger and faster.

So far, our oceans have been soaking up a lot of the excess carbon, causing slow changes in the acidity of the oceans that will make life there a lot harder for many plants and animals. It can't soak it all up forever.

What worried me recently is that I went to a seminar where scientists weren't the least bit concerned about the 'ifs', but the 'how soon' and 'how bad' questions. The science around climate change has more scientific consensus than the theory of evolution. They are quite calm when suggesting that we MAY have about 10 years to do something, before this runaway locomotive really starts heading downhill and really picks up some speed. We can't fix it up later, any temperature increases would take thousands of years to rectify even if we stopped pumping out CO2 now.

We have already discussed the impacts on marine life *ad nauseum,* and they are easy enough to see already in global hotspots like eastern Tasmania. The biodiversity of the planet is already declining (it was slowly declining even without climate change). We don't yet really know how much it will affect humans, there will be winners and losers, but it's not a good start to be on one of the world's drier continents as rain patterns alter.

The problem with this debate is that it will take hundreds of years for the effects to fully play out, way beyond our immediate lifetime and concerns. The 100 year impacts are already potentially bad on things like biodiversity, crops, storm events, and flooding, but it's the 300 year impacts that are really in doomsaying territory.

My family arrived here in the 1830s and helped to build a new civilisation in the south, living in subsistence poverty and struggling to get wheat and orchards to grow in an alien climate. The inheritance from 6 generations of hardship looks like it might be squandered in one, with the next 6 generations picking up the tab if they survive long enough.

I think if we are asked to pay a few cents more on petrol and power, that is a cheap insurance policy against the risk that our grandchildren and their children might one day pay the equivalent of $50 for a loaf of bread just to sink backwards into Dickensian squalor, in a sterile world devoid of living things. There is still time to make other choices, but not much time.

Great Australian Bight Oil Drilling

The Wilderness Society has released a map of new oil drilling locations.

BP wants to drill four exploration wells up to 2.5 kilometres deep off South Australia's west coast, about 400 kilometres west of Port Lincoln.

Two sites, Stromlo and Whinham, both of which fall within the Great Australian Bight Marine Park's benthic protection zone.

"There couldn't be a more inappropriate place to be proposing to drill than this," Wilderness Society's SA director Peter Owen said.

The response was "In BP's view this does not introduce any new activities, or new or different risks or impacts to the environment."

Sea Shepherd's vessel the Steve Irwin will be sent to protest against the proposed drilling.

The Immortal Jellyfish

A tiny transparent jellyfish is the only known animal capable of reverting completely to an immature stage after having reached maturity,

When *T. dohrnii* suffers a attack, or starvation, or stress, instead of dying, they change into a tiny blob, and then three days later shift back to the polyp stage and settle on the bottom. They regroup as a polyp colony sitting on a rock. This new polyp is genetically identical to the original jellyfish, but in a different form. Technically it's more like 'regeneration' than immortality.

When conditions improve this new polyp colony can form and release new jellyfish bells in to the ocean.

This jellyfish is being spread around the world in ship's ballast water.

GBR coral mortality

Preliminary findings from the Great Barrier Reef Marine Park Authority (GBRMPA) and the Australian Institute of Marine Science (AIMS) show approximately 25% actual mortality. The greatest mortality is in the northern third of the Reef, from Port Douglas to Cape York.

Dead coral skeletons covered in algae have replaced the once-vibrant coral in parts of the northern Great Barrier Reef hit by severe bleaching, new images reveal.

This was the most serious bleaching event to hit the Reef on record, and that it was related to a combination of warming of our planet's oceans and a major El Niño.

It is hoped that in areas where bleaching has been minor the Reef will bounce back.

Based on the results of in-water surveys to date, the average coral loss within each management area is:

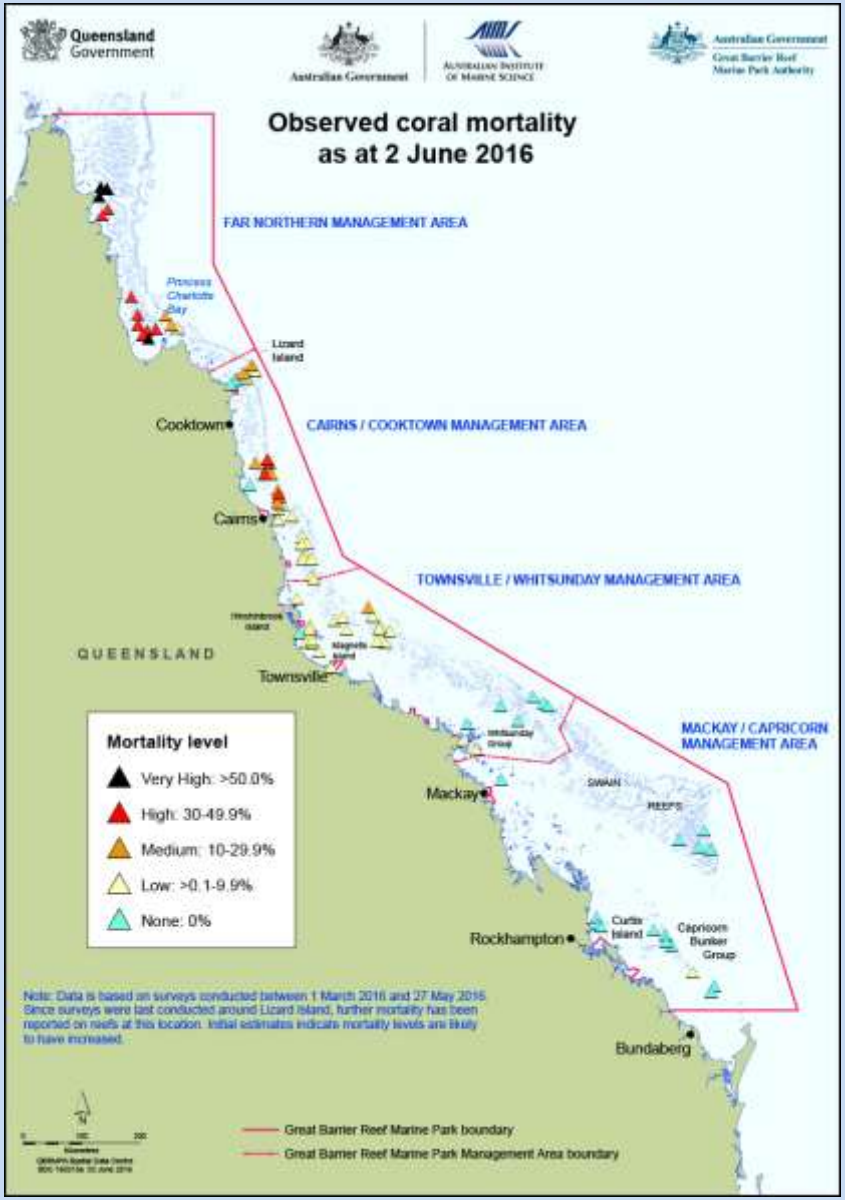
- 50 per cent in the Far Northern Management Area (from the tip of Cape York to just north of Lizard Island)
- 16 per cent in the Cairns–Cooktown Management Area (Lizard Island to Tully). (Note: Surveys around Lizard Island were conducted in March. More recent reports indicate mortality levels are likely to be higher in this management area.)
- 3 per cent in the Townsville/Whitsunday Management Area (Tully to Mackay)
- 0 per cent in the Mackay/Capricorn Management Area (Mackay to Bundaberg).

The overall mortality is 22 per cent — and about 85 per cent of that die-off has occurred in the far north between the tip of Cape York and just north of Lizard Island, 250 kilometres north of Cairns.

Dr Reichelt of GBRMPA said "The agency's strong protective measures, including no-take green zones which make up 33 per cent of the Marine Park, play a critical role in maintaining the resilience of the wider ecosystem.

"This underlying resilience was on display recently when the Australian Institute of Marine Science found coral cover increased by 19 per cent across the Marine Park between 2012 and 2015, nearly doubling in the southern sector due to good early recovery from cyclones and floods."

What is it like up close? Smelly basically. Photographs and video taken around Lizard Island, has recently been released by WWF-Australia. "Only a few weeks after the bleaching, the hard corals were dead and covered in algae, looking like they've been dead for years," Mr Vevers from XL Catlin Seaview Survey said. "The soft corals were still dying and the flesh of the animals was decomposing and dripping off the reef structure. "I can't even



tell you how bad I smelt after the dive, the smell of rotting animals," he said.

WWF-Australia said "This is a sad reminder of the impact of global warming. Our political leaders should be treating this as a national emergency."

What happens next?

GRMPA has seen all this before, the 1998 mass bleaching of corals was one of the most severe disturbances to coral reefs world-wide at the time. Researchers on the Great Barrier Reef documented the outcome of coral bleaching on *Porites* corals. In some cases, coral tissue regained their symbiotic zooxanthellae, and recovered.

In other cases, the bleached coral died, and was overgrown by algae. More severely bleached corals were more likely to die, such as the coral now in the far northern zone. The recovery of reefs, which depends on the settlement and successful growth of coral larvae, may be seriously inhibited by the dominance of fleshy algae which can be eaten off by large herbivorous fish (but only if we haven't overfished them.

The well-managed nature of the GBR gives some hope, but not if these severe events become more regular.

$1b plan to protect Great Barrier Reef

The election saw a lot of talk about the GBR. Speaking in Townsville, Mr Turnbull said Australia should be a "role model in management of coral reefs". The LNP promised to set up a $1 billion reef fund over 10 years. Environment groups weren't buying it, "Unfortunately that Reef Fund is existing money — it's part of the Clean Energy Finance funding…. The Queensland Government modelling estimated it could cost up to $16 billion to meet water quality targets over the next decade to save the reef.

Gulf of Carpentaria Affected by Heat Wave

Indigenous ranger Leonard Bowaynu, who has fished the same reef off the coast of Arnhem Land since he was teenager, had seen small scattered patches of white coral before — but never anything this extensive. "We used to go out, catch fish from the reefs. I never seen coral turning to white, like around the island or reef," he said.

Concerned by the image, rangers sent up a drone and GoPro camera to collect further evidence.Michael Mungula said, "At Murrangga [Island] we never seen white coral there before, during the 50s, 60s and 70s. But we seen it now, 2016." We need scientists to come here and do research in the Crocodile Islands,"

Meanwhile, 300 kilometres south-east, in waters around Groote Eylandt, Indigenous Rangers were watching giant clams turn white as well. Anindilyakwa Rangers on Groote Eylandt began trialling the cultivation of giant blue-lipped clams (Tridacna squamosa) five years ago. But in April the rangers noticed a number of the clams had turned white. It was first time he had seen the clams bleach since the trial was established in 2011.

"Our families, relatives, elders, they never told us about the coral bleach. It's happening now and we're worried … because there's big feeding there for turtles and fish and we want the scientists to tell us what is wrong ," Michael Mungula said.

In addition to problems in Arnhem Land recently reports surfaced of close to 10,000 hectares of dead mangroves along 700km of coastline reaching from Queensland to the Northern Territory. International mangroves expert Dr Norm Duke said it was the most extreme "dieback" he has ever seen he had no doubt the "dieback" was related to climate change

Photo: Dr Norman Duke James Cook University

"The images were compelling. They were really dramatic, showing severe dieback of mangrove shoreline fringing — areas just extending off into infinity," Dr Duke said.

The area the Northern Territory photos were taken in was so remote the only way to confirm the extent and timing of the mangrove dieback was with specialist satellite imagery. Satellite imagery pinpoints the damage to a period of around four weeks in September-October 2015.

The mangrove dieback in both states happened in the space of a month late last year, coincident with coral bleaching on the Great Barrier Reef.

"I started hearing that the wet season was missing from the Northern Territory over that time period," he said. "The wet season was only one-month-long in the year before. Usually the wet season in the Northern Territory in that area is three or four months long," Dr Duke said.

He said he was convinced unusually low rainfall in the 2014 wet season and elevated temperatures led to the massive mangrove dieback. He said a deadly lack of fresh water and increased water and atmospheric temperatures stressed the plants beyond their tolerance.

Mangroves are essential breeding grounds for fish stock including prawns, crabs and, in the north of Australia, fin fish such as barramundi. Dr Duke said he had heard anecdotal reports of lower-than-usual fish catches in the area of the Northern Territory he surveyed in June.

WA Kelp Disappears

Source ABC/ The Conversation, T, Wernberg

A new survey shows that vast areas of barren reefs are the new "normal" on a large swathe of the WA coastline.

Western Australia's marine environment is unique. Two world heritage areas, the largest fringing coral reef in Australia, and more than a thousand kilometres of underwater forests.

A 15-year survey started in 2000 and its just handed in the results. The survey stretched 2,000 kilometres from Cape Leeuwin in the south to Ningaloo in the north. The most shocking finding was that "Off the coast around Kalbarri to Geraldton, where these reefs used to be dominated by kelp forests, those forests have completely disappeared" said Dr Scott Bennett.

Kelp forests once covered more than 70 per cent of shallow rocky reefs in mid-Western Australia between Geraldton and Kalbarri. This is a 100-kilometre range contraction and effective extinction from 370 square kilometres of reef. Across the entire surveyed area about 960 square kilometres of kelp forest had been lost. The kelp forests were home to hundreds of unique species and commercially important to the wild abalone industry, which was worth about $200 million annually.

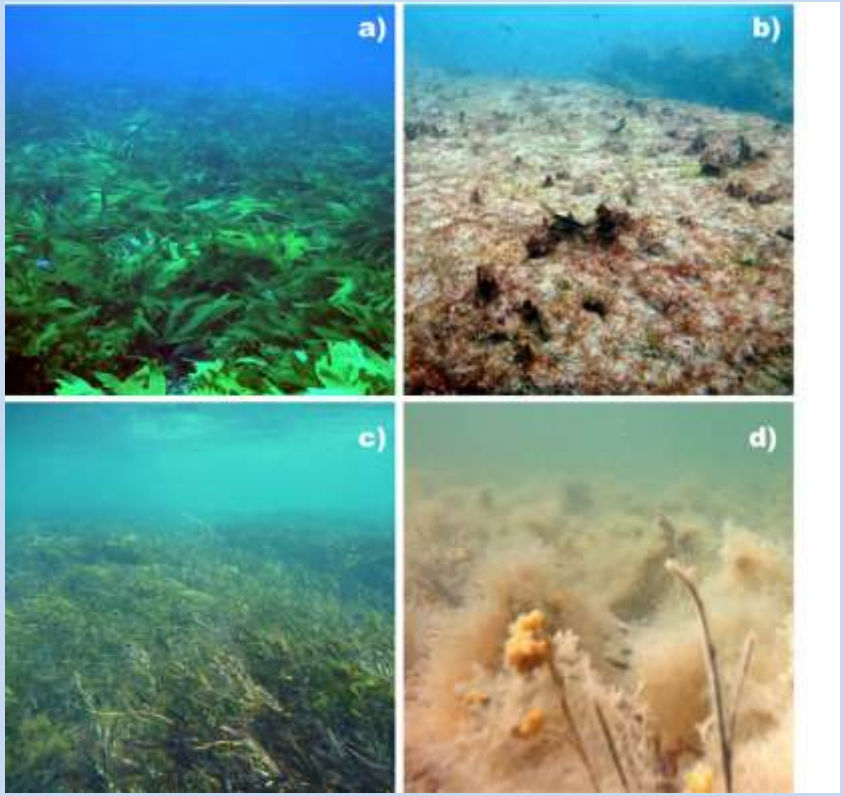
Dr Bennett said the research team initially thought it had made an error when it dived the reefs off Kalbarri. "We jumped into these waters at sites we've been going to for the past 10 years expecting to see large kelp forests and it was just a desert, it was barren," he said.

Associate Professor Thomas Wernberg, from the University of Western Australia described the kelp forests as the "biological engine" of the Reef. Temperate seaweed forests and seagrass meadows are like tropical coral reefs and forests on land - they provide food and shelter for a myriad of associated species.The researchers said economically the kelp forests supported some of the most valuable fisheries in Australia and reef-related tourism. The demise of these remarkable "forests of the sea" is likely permanent, researchers said.

The widescale death of the kelp forests started with a marine heatwave in 2011 with temperatures rising more than 2°C above normal for ten weeks (and temperatures not seen for 140 years). The marine heatwave affected more than 2,000 km of the west Australian coastline from north of Ningaloo Reef to Cape Leeuwin. Apart from damaging seaweed, further north, it caused severe coral bleaching and mortality.

That heatwave was followed by above-average ocean temperatures in 2012 and 2013 that compounded the effects. Five years after the heatwave, the kelp was showing no signs of rejuvenation, and many cool water fish, seaweed and invertebrates had also disappeared. Many of the species found along the coastline have evolved to live in cooler temperate waters. When peak summer sea temperatures soar, many species overheat and become physiologically stressed or even die.

"A lot of the [temperate] fish and invertebrates have disappeared and we've seen these communities shift to something that resembles the tropical fish and seaweed communities we would find at Ningaloo." Dr Bennett said turf algae had proliferated in the area and tropical fish communities had increased [by 400%] and were preventing the regrowth of the kelp by eating any that managed to re-establish.



With the Indian Ocean off the mid-Western Australian coast warming at a rate twice the global average, the kelp loss in the northern reefs also sounded a warning for kelp forests further south. Climate change was driving warming and more frequent heatwaves, Dr Bennett said, while the strong Leeuwin Current was helping the southward movement of warmer waters and tropical species. The survey had revealed that a rise in around 2.5 degrees C above long-term summer maximum temperatures was a "tipping point" for kelp forests.

Dr Alistair Hobday is a Senior Principal Research Scientist at CSIRO Oceans and Atmosphere said the changes seen in the reefs was equivalent to a change from a forest to a grassland. "We can expect more of these dramatic changes around Australia's coasts in future."

Readers should note that giant kelp has been long gone on the East Coast of Tasmania under a similar regime, with similar effects as black urchins overbreed and keep the barren reefs clear of kelp. I expect soon we will be seeing coral at Sydney and loss of kelp progressively working its way down the East and West coasts as the oceans warm and our major southwards flowing coastal currents strengthen.

La Niña events that cause heatwaves are forecast to become twice as frequent thanks to climate change. "Sadly, these changes could spell the end for large swathes of Western Australia's underwater forests and much of the marine life that depends on them for food and shelter" according to Thomas Wernberg and Dan Smale.

In the future, rising temperatures will result in further range-shifts of both macroalgae and invertebrates with local extinction of species along the southern coastline. Rising temperatures will also result in changes in species phenology [seasonal behaviour]. Ocean acidification will result in negative effects on calcareous algae and other calcifying organisms like shells. The combined effects of climate change and non-climate stresses (pollution, reduced water quality) will reduce the resilience of temperate reef communities to events like storms, diseases and invasive species. These changes will lead to loss of algal habitats. "These changes will happen progressively through 2030 to 2100."

Thomas Wernberg said that in 2009 and was probably called a doomsayer. Better drop those dates back a bit as we are seeing the changes already.

Harlequin fish are endemic to the kelp of western and southern Australia, but only for now, photo:Thomas Wernberg,

Actaeon Islands

The notorious Actaeon Reef is in reality a number of reefs situated at the southern entrance to the D'Entrecasteaux Channel, between Bruny Island and the Tasmanian mainland. It is a botanical, zoological, ornithological, fisheries, geoheritage and maritime heritage wonderland.

Goegraphy and Geology

Actaeon Island is a large reef system. Above sea level Actaeon Island itself is a group of three low lying tied islands that are connected via cobble tombolos (cobble banks). A further group of rocks and reefs 150 m south of the southernmost island are accessible at low tide. South of this is Sterile Island. Sterile Island is a small low lying island composed primarily of wave worked dolerite cobbles and small boulders resting on dolerite bedrock. It is surrounded by reefs, many exposed at low tide. These geomorphological features have been recognised as qualities of Outstanding Significance at a state level.

The islands are composed of dolerite largely surrounded by, and in places overlain by, wave worked dolerite cobbles and boulders. On the eastern side of Actaeon Island is a layer of friable sandy soil which has developed over thousands of years due to shearwaters and little penguin poo. This area is a popular fur seal haulout.

The northern island is the largest and highest at only 14 m above sea level. The total area of Actaeon Island occupied by terrestrial vegetation is 12.9 ha, comprising of the northern (10.25 ha), middle (0.95 ha) and southern (1.7 ha) islands. The total area of Sterile Island can be as big as 4.5 ha at low tide, with the vegetated portion less than 2 ha.

The southern and western coasts have a gentle slope into the sea and are partly protected by the large reefs to the south. The remains of a wreck and driftwood litter the shores.

History

The bands of indigenous Tasmanians who were living in the area included the Lyluequonny and Nuenonne who used of bark canoes to get to the islands. Stone arrangements that were likely made by aboriginal visitation were previously recorded on both islands. Aboriginal people may have introduce the swamp antechinus that they called *tore,er* to the island as a food source. They are so numerous that Europeans thought the islands were infested with rats.

In April 1792, through an error of navigation, the crews of the French naval vessels *Recherche* and *Esperence* were the first Europeans to see the Actaeon and Sterile Islands and gave the name of *Ile Steriles* (the Sterile Islands) to the reefs.

The islands were too small, stony and waterless to be put to much use by Europeans. In the 1830's or 40's a whaler's lookout and signal flag pole were placed on the islands. They were periodically visited by hunters and naturalists.

In 1884, naturalist Colonel William Legge noted wildlife on the island and recorded white bellied sea eagle and crested terns. Neither of these species have been noted as breeding on the island since. It might have had something to do with burning of the islands.

Actaeon Island has substantial mutton bird or short-tailed shearwater (*Ardenna tenuirostris*) colonies. For many years it was visited annually by locals for mutton birding, party's taking around 20 dozen birds each. In late November 1886 a yachting party were "menaced by a goat" left on the island. Rabbits were also introduced, but they have since died out. Even in the 1970s the island was crossed by trails, kept open by regular firing. On the first weekend of the mutton birding season in 1947, 200 dozen birds were taken on Actaeon. Sterile and Actaeon Islands were designated a Game Reserve in 1984.

Gemfish, Don't Mention the war

Primary Source AFMA, David Lockwood

Fisheries Managers often get hit with examples of mismanagement and complain they never get credit for the multitude of successes. They usually get criticism in the northern hemisphere about tuna and cod overfishing, in Australia its mainly orange roughy and gemfish. In the 1980s, despite obvious concerns these fisheries were overexploited and dying, they were allowed to catastrophically crash.

This fishery is now a shadow of its former self even decades later, and rebuilding of the stock is painfully slow. Sure, there were issues with politics and economic pressures, but I don't buy the argument that this was in the distant past, we are 10 IQ points smarter now, and the world has been reinvented.

It is true that most young fisheries managers weren't even out of their cots when this happened, but like it or not we occasionally need to be reminded about what happens when nothing is done to deal with an obvious problem, and when being in close cooperation with industry and government can lead to interminable delay.

Gemfish are a bottom dwelling fish which inhabit deep water off the New South Wales, Victoria, South Australia and Tasmania. They are generally found in large schools at depths of 100 - 800 metres on the continental shelf and upper slope (maximum recorded depth is 1254 m). They are more generally found in waters about 250 m – 500 m deep. This species is usually caught close to the sea floor but the fish are likely to move into mid-water at times. Juveniles are pelagic. The gemfish is a member of the family Gempylidae, which includes the snoek or barracouta. Gemfish are also known as Hake. They grow up to about 1.2 metres in length and 15 kg and live up to 17 years. They are commonly found at 60-90 cm in length and 2-6 kg in weight. Females reach reproductive maturity at 4-6 years, with males reaching maturity at 3-5 years.

Mature gemfish aggregate prior to spawning in the eastern stock. This begins with the aggregation of fish north of Bass Strait in autumn, and concludes with fish reaching the spawning grounds off Crowdy Head, NSW, in August. The eggs and pelagic larvae are then carried back down the NSW coast by the Eastern

Australian Current. Spawning occurs in summer for the western stock and occurs west of the Great Australian Bight. We don't know much about that stock. Females produce 1-1.5 million eggs each spawning season depending on their body size.

A large commercial fishery was developed for gemfish off NSW in the 1970s. Catch of eastern gemfish peaked in 1978 at more than 6000 t, then decreased rapidly after about 1987 with declining mean length of fish in the spawning population and reduced catch rates in the winter fishery.

In 1988 eastern gemfish became the first species in the South East Fishery to be subject to a Total Allowable Catch (TAC) which was set at 3 000 t. In the early 1990s the spawning stock was also significantly reduced by a series of very poor recruitment cohorts and the TAC was progressively reduced to zero by 1993. The fishery effectively permanently collapsed with trawl catches currently only 100 tonnes or less per year even decades later.

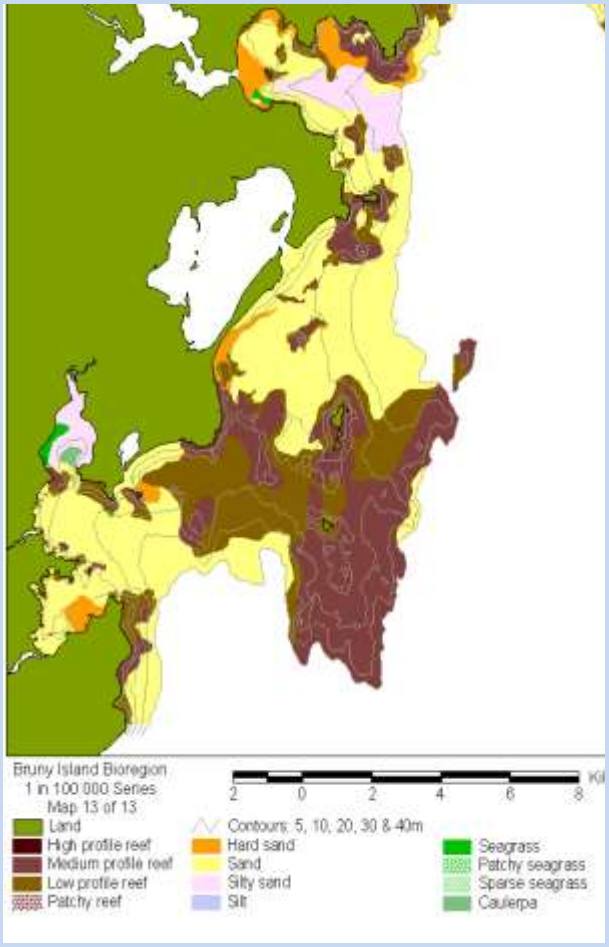
Eastern stocks are managed under AFMA's *Eastern Gemfish Stock Rebuilding Strategy*. If adopted and it works, it will take another 20 years or so to recover the stock from 14% to 20% of the unfished stock. The ultimate target is 48%, which gives maximum sustainable yield. However, recruitment over the last 25 years has also been weaker compared to the period from the 1970s to 1980s. Recreational and NSW commercial catch also have the potential to impact on recovery times. Estimates of catch from both of these sectors are unreliable and need improvement. The report says that "rebuilding within the target timeframe is unlikely". Not much of a confidence booster.

The NSW Fisheries Scientific Committee (FSC) has made a proposed determination to list the eastern gemfish (Rexea solandri) in the Threatened Species Schedules of the Fisheries Management Act 1994. According to Atlantis models, which take a whole of ecosystem approach including fishing and climate parameters, there is a risk the eastern gemfish will be extinct by 2040.This is bit unclear though.

Twenty years of unrestrained fishing might end up leading to 100 years of repair work, with not many fish landed in the meantime. The 'black hat' scenario is permanent extinction, the first for a fertile oceanic species when many argue that it is virtually impossible to make such a fish extinct. It should be noted, that although it is a small catch, we still allow commercial fishing and there is still a recreational bag limit in NSW of 2 fish per day. So much for the brave new world.

This is the sad story with eastern gemfish population, but the good news is that western stocks didn't get the uncontrolled fishing effort of the 70s and 80s and is doing fine.

Actaeon Islands Underwater Life



Although nominally in the Davey Bioregion that dominates South Western Tasmania, the Actaeons contain many features in common with both the Davey and Bruny bioregions. The outer coast in this area is subject to the heavy swells that characterise the Davey Bioregion. Inshore, it also includes an extensive network of coastal reef and delicate *Macrocystis* forests.

The shallow reef area forms a barrier that provides some protection to a substantial portion of coast and reef inside this barrier.

The reef in the vicinity of the Actaeon Islands is vast. Inshore reef in Tasmanian waters is usually limited to a narrow coastal fringe, making this reef system an unusual feature.

Reef habitats on the highly exposed outer Actaeon Islands are dominated by bull kelp *Durvillaea* to depths of 10 m or more. As the swell force lessens, crazyweed *Phyllospora* dominates from 5 to 15 m . Strap weed *Ecklonia* is then common from 10 to 30 m. Red algae is common in the shade of the larger plants below 10 m and sponge communities dominate below 30m.

Inside the Actaeon Islands, exposure is moderate. *Macrocystis* is common in the moderately exposed areas, forming extensive beds on reefs of 5-15 m depth inside the Actaeon Islands

Unique Handfish

The Ziebell's Handfish has been found on the edge of ginat kelp forests (*Marcrocystis pyrifera*) at the Actaeon Islands. The species is found at depths of between 3m and 20m. The Ziebell's Handfish was named after the diver that handed in the first specimen back in the 1970s. Other material says the fish appears to prefer soft-bottomed habitats, with patches of rock that support sponge and algae communities, which they use as spawning substrate.

The area also once boasted Red Handfish. Graeme Blight found some here in the 1980s. The colour form was very red, whereas in other parts they are a softer blend of primary colours.

One abalone diver recently told me that they would see a couple of Ziebell's handfish every year on the edge of the kelp, but none in the last 10 years, coinciding with a dramatic loss of kelp density.

Premier Abalone Fishery

The Actaeon Reef system is Australia's most valuable region of coast in terms of economic yield from abalone fisheries harvests.

This remarkably productive region has average production of around 350 tonnes, comparable to the entire WA and NSW catch combined.

Abalone sub block 13E (which contains the Actaeons reef system) has maintained a high level of productivity since the commercial abalone industry commenced in the mid sixties. At current prices, this sub block generates about $10 million each year in export revenue for Tasmania.

An abalone fishery reserve at George III Rock has existed in this region since 1985 and has probably helped to keep the area productive. Tests indicated that abalone populations are largely (90–100%) self-seeding from other local abalone, rather than distant reefs.

The relatively large apparent export of larvae from George III Rocks 'no take' area may be important at least for local replenishment of abalone stocks and to contribute to the productivity of a fishery.

Catch and catch rate from this region have declined over the last few years showing that perceptions that this area is robust to high fishing levels could be wrong. The basis for the remarkable productivity of the location is a mystery. There is no information available to assess risk or protect future production.

The Actaeons are critical to the Tasmanian fishery because any decline in catch from this location sends a cascade of shifting catch effort to other areas that is difficult to manage.

Giant Kelp Disappearance

"There is one marine production, which from its importance is worthy of a particular history. It is the kelp, Macrocystis pyrifera. This plant grows on every rock, from low-water mark to a great depth, both on the outer coast and within the channels…The number of living creatures of all Orders, whose existence intimately depends on the kelp is wonderful. A great volume might be written, describing the inhabitants of one of these beds of seaweed….I can only compare these great aquatic forests of the southern hemisphere, with the terrestrial ones in the inter-tropical regions." (Charles Darwin 1845)

The sheltered giant kelp forests of the Actaeons are home to schools of pike, trumpeter and sweep. Sweep are a more recent arrival this far south, a symptom of the warming waters of the East Coast. The area is still blasted predominantly by colder Southern Ocean currents rich in nutrients, allowing some of the forests to hold on, where 90% of the kelp forests on the East Coast of Tasmania have disappeared. The Far South has always been acknowledged for its large kelp forests,

"Southport is situated on the south part of Recherche Bay,...but

that on the NW side, although there is a depth of 3 fathoms, is so choked with weeds, that it was with difficulty a boat could pass." *The Australian Directory, 1830*

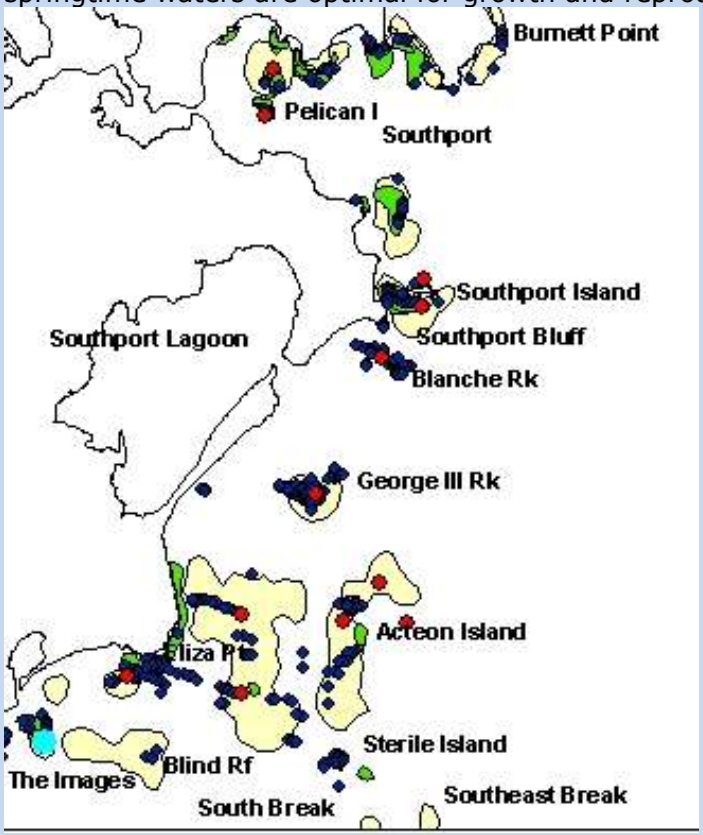
According to abalone divers in the last ten years the density of the kelp forests has fallen dramatically.

The kelp canopy is a major habitat for marine life. When growth is vigorous, the kelp forest is crowned by a dense surface canopy. The canopy acts as a nursery for juvenile fishes, attracting swirling schools of small bait fish and predatory fish. The kelp canopy also provides a resting place for seabirds and seals.

The Giant Kelp plant an essential source of nutrients for many animals. For example, limpets ingest broken pieces of kelp from offshore beds and detritivores ingest microscopic pieces of kelp after it has broken down in the surf. On the seafloor, large numbers of filter-feeders or suspension feeders (such as sponges), feed on kelp detritus. This abundance is also probably due to the concentrated settlement of planktonic larvae beneath the kelp canopy, which has accumulated because of the reduced water flow (compared to more exposed hard substrata).

Reproduction and growth in Macrocystis pyrifera is strongly coupled to environmental fluctuations. Cold, nutrient-rich

springtime waters are optimal for growth and reproduction. In



Tasmania a number of factors-linked with El Nino episodes-have probably dampened reproductive success including rising in minimum water temperatures, declining influence of Sub-Antarctic waters, increasing influence of subtropical Eastern Australian Current waters, reductions in seasonal and inter-annual variability in sea temperatures on the east coast.

A report by Dr Karen Edyvane in 2003 was seen at the time as unduly pessimistic, but if anything it got worse. Some kelp forests have fluctuated but 95% historic kelp loss on the East Coast is now the 'new normal'. It ebbs and flows. Lagoon Bay kelp forest recently disappeared but has now reappeared. Fortescue Bay has disappeared completely but there are new recovered beds in Munroe Bight near Cape Pillar.

Yellow shows the kelp forests recorded on 1890s nautical charts, according to abalone divers the area inshore of the Actaeons has thinned dramatically since about 2004.

NOAA landsat, A September 2014 photo shows missing kelp beds in the area, however, In October 2015 I noted that the bed north of Southport Island has returned.

Land Flora

The islands have been dramatically changed by fire particularly evident on the northern Actaeon island. The deeper soils mean that it should be covered in tall scrub or forest. However, localised disturbance by burrowing penguins and mutton birds, and small scale patch burning by Aboriginal people prevented this. Instead, it has had a relatively diverse mosaic of vegetation.

The dense regrowth scrub, bracken and weeds that currently dominate the island have resulted from a succession of high intensity island-wide fires. The centre part of the northern island is covered in dense blackwood scrub with, blackberries and mirror bush (*Coprosma repens*) tangling in between the trees. The understorey is thick with leaf litter and bracken (*Pteridium esculentum*).

Around the margins of the scrubby centre is very dense, head high bracken.

Mutton bird rookeries are covered by tussock grass, bracken, scattered herbs and small shrubs. On the edges of the coastal rocks where there is less soil depth, the vegetation is dominated by coast groundsel.

The other islands are relatively bare, but have weeds including large amounts of brome. The vegetation is dominated by fireweed, coastal saltbush, native pigface (*Carpobrotus rossii*).

In total, 49 species of vascular plant, seven of which are introduced, have been recorded from Actaeon Island.

The vegetation on Sterile Island also boastd sawleaf daisybush (*Olearia stellulata*) and coast groundsel (*Senecio pinnatifolius*). The centre of the island is dominated by tussock grass (*Poa poiformis*) On the lower energy southern shore, low mats of bower spinach (*Tetragonia implexicoma*) occur above the high tide mark. This area is a favoured nesting spot for gulls.

Actaeon Island was noted by John Gould in 1838 and Colonel William Legge in 1886, as being dominated by "barilla bush", also known as Grey saltbush [A*triplex cinerea*]). This species appears to have been wiped out by fire.

The vegetation of the island is presently in a state of flux, with scrub and weed taking over as fire and seabird disturbance lessens. Maybe one day it will stabilise back to a more natural state.

Cheap Boating Alternatives

RedMap sees fish on the move

Yellow-bellied sea snake, now seen at times in Tasmania

WARM sea temperatures during summer 2016 have lured unusual warm water marine animals as far south as Tasmania. Temperatures off Tasmania's North-East hit a record 21C.

Anglers are enjoying catches of yellowtail kingfish, King George whiting, snapper and broadbill swordfish. Sightings include moonlighter fish, blue moki, dusky morwong. nautilus shells and nutmeg sea snails.

University of Tasmania's Dr Gretta Pecl said "There is a general pattern of species shifting south in the southern hemisphere and north in the northern hemisphere".

The unusual marine sightings around Tasmania have been noted on Redmap, one of the nation's largest citizen science projects that logs unusual sightings.

A coconut was found at Marion Bay, a Balmain bug in the shallows at Tinderbox and blue bottles at the very bottom of South West National Park.

Two venomous yellow-bellied seasnakes made a marathon swim to the East Coast – far from their usual range in tropical northern waters.

Dr Pecl encouraged anglers to continue reporting to Redmap about their catches of yellowtail kingfish and snapper. "We hear of snapper and yellowtail kingfish being caught, but lots of people don't report them," she said.

Tasmanian Association for Recreational Fishing chief Mark Nikolai said some fish species that were considered rare only a few years ago are now so common they are attracting fishing tourists to the state. He said interstate anglers were especially interested in the large marlin and broadbill swordfish that were venturing south to Tasmanian waters. "I caught a 3-4kg kingfish four years ago at Port Arthur, at a time when they were unusual. Now there are 8-10kg fish being caught in the South," he said.

Well the fishing may be lovely, but do I need to remind everyone what is causing this, or what is happening to the cold temperate species whose habitat is becoming either increasingly unsuitable or increasingly invaded by range-shifting sopecies. Some like NSW black urchins, have stripped large section of Tasmania's East Coast reefs, making them barren.

Giant Kimberley marine park

Once established later this year, the Great Kimberley Marine Park will take in coastal waters from Camden Sound to the Northern Territory border, an area of 30,000 square kilometres which is home to pristine coral reefs, marine turtles and the world's biggest population of humpback whales. Draft plans show that only about one-fifth of the park is set aside as sanctuary zone, also known as a no-take zone.

Depending on who you talk to, it's also a way of locking up fish, of creating Aboriginal jobs, a boost to the fledgling Kimberley ecotourism industry, a marketer's dream.

University of Western Australia marine scientist Jessica Meeuwig sees little protection in what she likes to call "paper parks".

She is critical that some WA marine parks, including one of the four under the Great Kimberley Marine Park banner, have no sanctuary zones.

"Problematic is that recently established (Roebuck Bay) and proposed (North Lalang-garram) marine parks have no areas allocated to sanctuary zones, rendering them largely 'paper-parks' with business as usual," she wrote in a government submission.

WA Fishing Industry Council, whose chief executive John Harrison argues that sanctuary zones lock up fish which were already being managed sustainably. "What are we protecting from what?" he asked.

Dr Meeuwig, along with environmental groups like the Pew Charitable Trust and scientists, has long campaigned for marine parks to have at least 30 per cent no-take zones.

Also questioned was why seismic testing was allowed in an area established for conservation. Seismic testing is also a concern for the Kimberley's famous pearling industry, which operates within both state and Commonwealth marine parks at Eighty Mile Beach, in between Port Hedland and Broome.

But if there is one issue that unites just about everyone, it is the opportunities for developing the potential of the Great Kimberley Marine Park as an ecotourism destination. The real economic value of conservation and tourism in the Kimberley was $100 million annually, with the cruise industry showing strong growth potential.

Actaeon Islands Bird Life

If you land on the islands, you won't see many birds other than invasive gull species. Only a single Pacific gull (*Larus pacificus*) and two pairs of sooty oystercatchers (*Haematopus fuliginosus*) were observed nesting on the islands. Upwards of 100 non-breeding silver gulls (*Chroicocephalus novae-hollandiae*) also hang about. Actaeon now supports a large breeding population of kelp gulls. The nesting sites of the kelp gulls appeared to be concentrated on the southern islands. In the 1950's kelp gulls were vagrants that were not known to breed in Australia at all. Thanks to human tips and fish farms their numbers have increased dramatically and they now remain in the State full-time.

More birds are hidden during the daytime. There is a dense colony of little penguins (*Eudyptula minor*), estimated at 500 breeding pairs. There are also about 2,000 pairs of short-tailed shearwaters nesting on the islands.

Penguin decline

When the island was previously surveyed in early December 1980 there twice as many pairs of little penguins. The cause of decline in this colony is not known. As there is no strategic statewide population monitoring program in Tasmania, it is difficult to gauge Little Penguin population trends.

DPIPWE zoologists have suggested that the decline is possibly due to penguin bycatch in recreational gill net fisheries out of Recherché Bay and Southport. However, DPIPWE fisheries scientists only rate the net risk to penguins as "moderate". Penguins do get caught in nets. A Brazilian study of Magellanic penguins suggests capture rates varied from 41.7 to 125.0 penguins/km of net, a phenomenal amount of by-catch, but the fishing and animal behaviour here is different.

Dr Lyle's study found net fishing effort in the D'Entrecasteaux Channel involves approximately 8000 recreational net days (200 000 metres of net a year). In over 3400 commercial and research gillnet deployments recorded a total of only 22 seabirds entangled in gillnets including 5 little penguins (all but one drowned). This low by catch rate was statistically unreliable. However, its the best estimate we have, so using this 0.147% penguin encounter rate, 11.76 birds might get caught in nets in the D'Entrecasteaux Channel at the current rate of net use. These figures are insignificant in terms of the breeding rate of penguins.

Nets inadvertently set off penguin colonies are the most dangerous. Anecdotal reports exist of 20 birds caught in one night in Rocky Cape NP, but this would have had to be a net set right off the landing beach, at dawn or dusk. The research gillnetting was designed to avoid areas where there was potential for high rates of interaction with seabirds (e.g. adjacent to penguin colonies).

Fishers more broadly were also surveyed and asked to report bird entanglements in nets. Out of 129 respondents who answered this survey question, 39% reported the incidental capture of penguins. This is likely to be under-reported if anything. The vast majority said seabird encounter rates were very rare (< once every 20 trips) [assuming 80% fatalities over 8000 soaks, this would equate to 400 birds of all types caught just in the D'Entrecasteaux Channel alone. If 29% are penguins, that is 116 caught and 92 drowned]. That is a much more significant rate of loss.

However, I don't see netting as wholly explaining the particular issue at the Actaeons. It's a remote and exposed area likely to have lower rates of net use. There are 200 holders of commercial rock lobster licences that are also entitled to use up to 150m of graball net for catching bait. However, both commercial and recreational inshore netting effort has been falling, having halved since the 1990s. Penguins may have been increasing in the

Derwent estuary over the same time period, but it is likely to have been brought about by improved habitat security as much as by declining netting effort.

Penguin populations also fluctuate with food availability. As a shore-bound bird during nesting and moulting they are also prone to predator attack. It is interesting that kelp gulls have taken over large parts of the islands. Kelp gulls are known nest robbers, highly adaptable, and will even attack penguins. While it is unlikely that they kill many, kelp gull harassment may also be a deterrent factor in penguin nest selection. A lot more study is needed before we can find the causes of population decline at the Actaeons, and it's unlikely to be a single cause.

Orange-Bellied Parrot

The famous naturalist and artist, John Gould, visited Actaeon Island in December 1838 and noted small flocks of a *Grass Parakeet* which he flushed from cover whilst walking around the island. He had observed the species sparingly around Hobart and New Norfolk but never in such abundance. He called the species the burrow nesting grass parakeet of Actaeon Island. Not rolling off the tongue, it is now known as the orange-bellied parrot (*Neophema chrysogaster*).

A specimen of the Actaeon parrokeet was tabled at the Royal Society of Tasmania meeting in December 1856 where eminent botanist Ronald Gunn stated the specimen was merely a colour variant of the blue-winged parrot, also an incorrect assessment. *The Birds of Australia: in seven volumes*, which was produced by John Gould between 1840 and 1848, contained a lithograph of two orange-bellied parrots sitting in a barilla bush as he had seen them on Actaeon Island.

Historical reports of "thousands" are made from the 1830's, 1880's and the 1910's. In 1886, Colonel William Legge noted that the orange-bellied grass parakeet was always present on Actaeon Island between November and December.

The decline appears to have been most dramatic since the 1940's but the population may have stabilised in recent years (1975 - 1985) at its present very low level of 100 to 200 birds.

The orange-bellied parrot breeds in Tasmania and winters near the coast, foraging on saltmarsh species, beach or dune plants and a variety of exotic weed species.

Orange-bellied parrots now only breed in South West Tasmania, where they nest in eucalypts bordering on button grass moors. The entire population migrates over Bass Strait to spend the winter on the coast of south-eastern Australia. On the way, they may stop (and occasionally overwinter on) King Island.

The Actaeon nesting areas were probably destroyed by fires.

Sources IMAS, Trove, DPIPWE, FRDC, CSIRO, Genetic diversity and gene flow in collapsed and healthy abalone fisheries MILLER, MAYNARD and MUNDY, *Assessing the impacts of gillnetting in Tasmania: Implications for by-catch and biodiversity Lyle et al 2014, South Bruny and its Offshore Islands DPIPWE, Kelpwatch, NOAA*

Shipwrecks at the Actaeons

The *Actaeon*, a ship of 305 tons was built at Fort Gloster, India in 1815 and owned by J. Scott & Co. of Calcutta. In October 1822, the ship Actaeon gave her name to the island and reef system when she ran aground at midnight "very near to a small island" [Actaeon Island]. The European and Indian crew remained on the island and the cargo of salt pork, spirits, wines, soap, and piece goods was salvaged while the weather held. The ship was totally wrecked during a gale and 3 of the salvagers was drowned. A substantial part of what was left washed out to sea. The Actaeon was on a voyage from the Isle of France (Mauritius) to Hobart. A rudder pintle was recovered from the sea bed, east of the Actaeon Reef in the 1970s by abalone diver, Harry Clarke, who saw part of it protruding from the sand. That is all that remains of her apart from a name on a map.

1835 was a year of disasters around the Actaeons. The convict transport George III went up on a rock inshore of the Actaeons with great loss of life (covered previously in this magazine).

The Wallace was a new ship of 337 tons, and this was her first voyage, with a valuable general cargo. When about two miles (actually 400 metres) to the southward of Sterile Island, the vessel struck, "the first shock was slight, but within a few moments a second was felt--so violent, that it cast the man at the wheel, unshipped the rudder, and at the same moment rendered the vessel unmanageable". The boats were immediately lowered, and the passengers and crew landed on Sterile Island. Help arrived at the Actaeons on the next morning, "the Wallace was a melancholy sight; she appeared perfectly upright. Her fore and main masts had gone overboard, and the mizzen rigging had been cut away; but the spur was tough and held firm"..."It was utterly impossible to adopt any plan by which the property on board might be rescued. The agent for Lloyd's, as also the agent for the vessel, proceeded in a whaleboat, to the leeward of the Wallace, but the surf was so great, that it was dangerous to approach within a couple of hundred yards". The sea was impregnated with rum from the damaged hull and the smell overpowering, " during this time, [the wreck] was lifted by each succeeding swell, and as she had fallen over to windward, she was absolutely grinding her cargo at every lurch she took. Finding there was no chance of saving any part of the cargo". The "Wallace" site lies on the reef system is known as the South

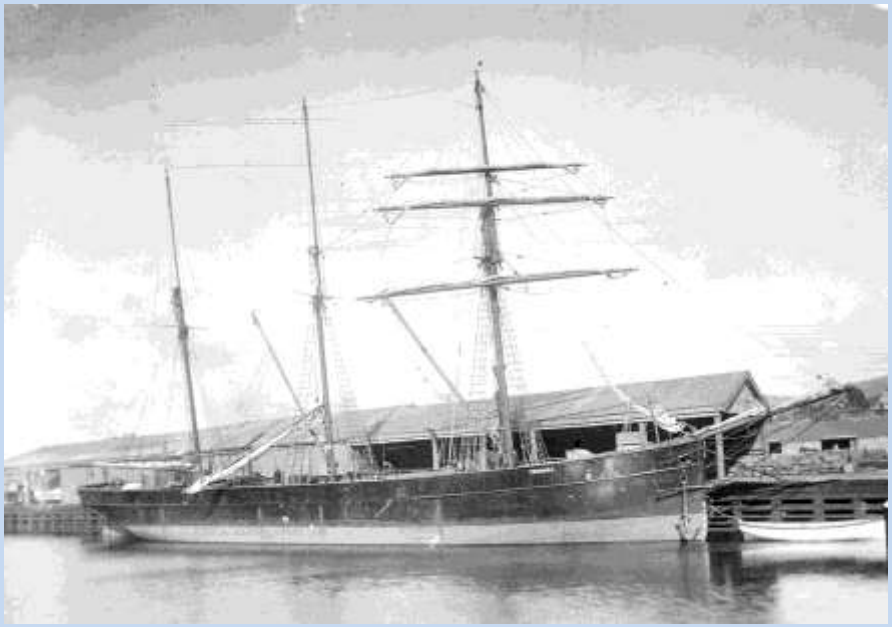
East Break. The site is concentrated in a number of small gullies at a depth of 2-3 metres. The main features are three iron anchors, a small bore cannon, and a number of iron concretions. The abalone diver who found it was too busy looking for abalone to notice anything else. It was only after he put his hand on a gun stanchion, which broke off, that he realised he was on top of an old wreck.

Later in 1835, the "Orrissa" from London narrowly escaped when she came right amongst the reefs between the South East Break and Sterile Island. Luckily, the Captain hit near the only passage through and they refloated and got away. These wrecks led to the building of a lighthouse at South Bruny in 1836.

In 1895, the "Wild Wave" grazed a rock at the southern end of the reef system.

By 1902 requests had been made to the Hobart Marine Board to consider erecting a beacon of some kind on "the Actaeons". In 1909, the island's cobbles were mortared together and whitewashed to produce a 30 foot high obelisk to mark Sterile Island.

In 1910, the Union Company's steamer "Wainui" grazed the outer edge of the bank off Sterile Island (the South Break). The impact was slight and she merely dented some plates and a propeller tip.



In 1929 the iron schooner Thuraka, formerly a South Australian tug, was becalmed. A steamer offered a tow, but in the early hours of the morning, mistakenly dragged her across some hidden reefs near Actaeon Island. The crew made it to the deck but she was obviously foundering. The tow steamer came alongside and rescued the crew. Within an hour her hull disappeared below the surface. Daybreak showed only the tops of the masts above the surface of the water, and they were swinging with the tide, as if the vessel were about to roll over.

The loss of small craft and drownings of fishermen continue even to this day. In 2012 the fishing boat Jan Hardy was lost on the SW corner of Actaeon Island.

Sydney's Forgotten WWI Fleet

Scuttled naval vessels of the interwar years 1919-1939

Several Australian naval vessels were lost in encounters with the enemy and have entered official war histories and honour rolls. Just as much naval hardware has been lost due to defence budget economies, accidents, the ravages of time and unduly long periods of peace. Sometimes their remains are well-preserved and their wreck sites hold lots of interesting insights into our naval history. The economies of the inter-war years saw a whole generation of WWI warships scuttled off Sydney, usually in deep water.

The Battlecruiser "Australia"

The first vessel to be described was lost due to peace rather than war. HMAS *Australia* our only battlecruiser, was flagship of the RAN when it was formed in 1913. At the start of World War I, *Australia* chased the German Pacific Fleet prompting them to withdraw to the South Atlantic where they were cornered and destroyed by the Royal Navy. It was then used to capture German Pacific possessions like New Guinea. She then served out the rest of the war in the North Sea.

Post-war budget cuts saw *Australia*'s role downgraded to a training ship before she was placed in reserve in 1921. The disarmament provisions of the Washington Naval Treaty required the destruction of *Australia* as part of Britain's treaty commitment. By this time, battlecruisers built before the Battle of Jutland were considered obsolete anyway and shells for her guns were no longer being made. Many in the public thought that sinking *Australia* was a major blow to the nation's ability to defend itself. Growing tensions between Japan and the United States of America were being felt. However, she was not really capable of going on as a defence asset without a major refit, something the RAN could not afford.

She was scuttled off Sydney Heads in 1924 in very deep water. The wreck has been visited by a robot camera ROV and is still in good condition.

HMAS *Encounter*

She was a second-class protected cruiser of the *Challenger* class. She was built by HM Dockyard Devonport and completed at the end of 1905.

Encounter spent the first six years of her career operating with the RN's Australia Squadron, before being transferred to the newly formed RAN. During World War I. *Encounter* operated in the New Guinea, Fiji-Samoa, and Malaya until 1916, when she returned to Australian waters. The ship spent the rest of the war patrolling and escorting convoys around Australia and into the Indian Ocean.

Encounter was paid off into reserve in 1920, but saw further use as a depot ship (renamed HMAS *Penguin)* until being completely decommissioned in 1929. In 1932, the cruiser was scuttled off Sydney.

She is the largest diveable wreck in Sydney at 115 metres length, and 5880 tons. The bow area is the most dominant feature with some penetration possible. Marine life is usually prolific with large schooling fish often seen. This wreck is used for student training on Trimix technical diving courses.

HMAS *Pioneer*

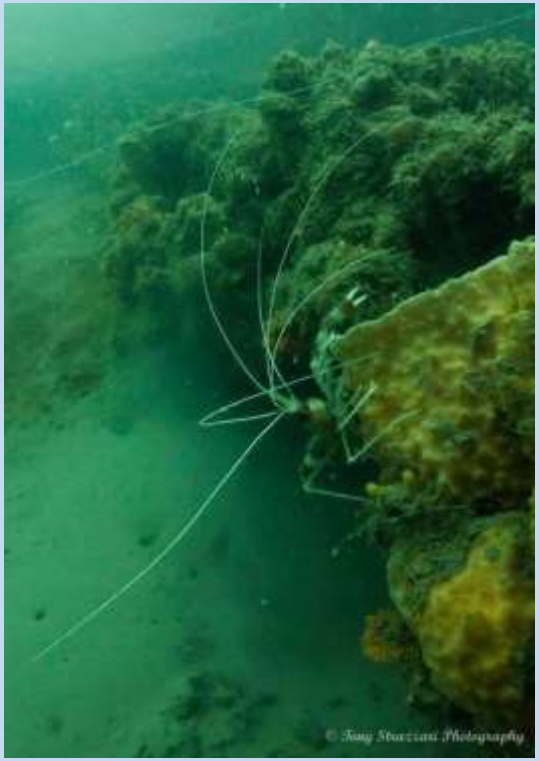
This *Pelorus*-class light cruiser was built at the end of the 19th century. She was transferred to the RAN in 1912. During World War I, the cruiser captured two German merchant ships, and was involved in the East African Campaign. She returned to Australia in late 1916 and was decommissioned. *Pioneer* was used as an accommodation ship for the following six years, then was stripped down and sold off by 1926. The cruiser was scuttled outside Sydney Heads in 1931.

The scuttled vessel lies in

67 m of water approximately 4.4km offshore and was found in March 2014. There is still intact structure and the wreck is standing off the bottom to heights ranging from 2 m to 5 meters.

HMAS *Psyche*

photo Andrew Johnstone



This Pelorus light cruiser was an old design built in 1898 at the Devonport RN Dockyard. Psyche was used as a troop convoy escort from New Zealand in World War I and while in Hong Kong briefly became the Admiralty's China Squadron flagship. The vessel also took part in the Battle of Bitapaka when involved in operations to capture Germany's Pacific colonies, such as its Samoa protectorate.

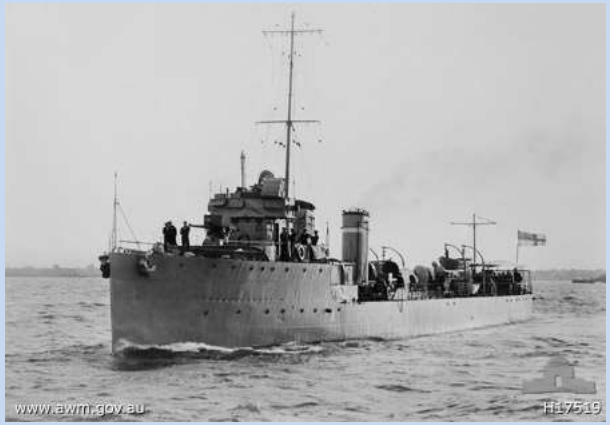
She was commissioned into the RAN in 1915 in time for one of the more boring phases of the naval war. Tropical heat, disease and mind-numbing routine ship patrols in the Bay of Bengal sparked one of the armed services first mutinies. The boredom didn't last, HMAS Psyche very narrowly escaped a near fatal encounter with the German raider Wolf in 1917.

She was sold and hulked July 1922. She was used at Port Stephens NSW as a timber lighter until she sank in Salamander Bay in 1940.

From 1950 till 1973 RAN Clearance Diving Teams used the sunken hull for exercises and her remains are now scattered. There is a fair bit of the hull still left. Visibility under water is down to about 1.5 metres. It's always silty and the old wreck is covered in anchors. She is described as a pile of scrap metal smothered by sand. Even then, marine life clings to this artificial reef and the structure attracts a cloud of fish. OK, she isn't like a Thai diving resort, but if it seems boring look harder and dig deeper into this relic of a lost era.

River class destroyers

HMAS Yarra



HMAS *Yarra* was a River-class torpedo-boat destroyer of the RAN. She was ordered in 1909. *Yarra* was temporarily commissioned into the Royal Navy on completion in 1910, and handed over to Australian control on arrival in Australia.

From 1914 to 1917, *Yarra* was involved in wartime patrols in the Pacific and South East Asian regions, before she and her sister ships were transferred to the Mediterranean for anti-submarine operations. She returned to Australia in 1919, and was used primarily to train naval reservists. Decommissioned into reserve then reactivated on five occasions between 1919 and 1928, *Yarra* was paid off for the final time in 1928. She was taken to Cockatoo Island Dockyard for stripping and then was sunk in 1932 as a target ship.

HMAS Torrens

She was a River-class torpedo-boat destroyer of the Royal Australian Navy (RAN). The destroyer was built at Cockatoo Island Dockyard and entered service with the RAN in 1916. The destroyer was first deployed to East Asia, then the Mediterranean, where she remained for the rest of World War I.

After returning to Australia, the destroyer was decommissioned, but saw use in several ports for reservist training before the decision to sell her for scrap was made. In 1930, after being stripped, the destroyer was towed outside Sydney Heads. She was used as a target for gunnery practice by HMAS Canberra and HMAS Albatross. Although `Torrens' was hit by many practice shells she would not sink but was eventually sunk with a demolition charge.

HMAS Swan

Swan was built at Cockatoo Island Dockyard, and entered service in 1916. The early part of the ship's career was spent on blockade duty in the Far East, before she was transferred to the Mediterranean for anti-submarine duty. The destroyer was placed in reserve in 1920. She was reactivated between 1925 and 1927 and assigned to Tasmania. *Swan* was decommissioned in 1928, stripped of parts, and sold for use as prisoner accommodation on the Hawkesbury River.

On 2 February 1934, *Swan* and *Parramatta* were being towed down the Hawkesbury River for final breaking up in Sydney, when gale conditions caused both hulls to break their tows *Parramatta* ran aground and *Swan* filled with rainwater and capsized at Tumbledown, near Croppy Point and Wobbly Beach. The exact location of the wreck was forgotten until 2001, when a RAN hydrography team came across the wreck while updating charts. *Swan* sits in only 20 metres of water, but its very murky and the currents in the area flow at around 4 knots. Visibility is less than 1 inch (25 mm).

HMAS Parramatta

She was the first ship launched for the Australian navy. From 1914 to 1917, *Parramatta* was involved in wartime patrols in the Pacific and South East Asian regions, before she and her sister

ships were transferred to the Mediterranean for anti-submarine operations. She returned to Australia in 1919, and was placed in reserve. *Parramatta* was fully decommissioned in 1928, stripped of parts, and sold for use as prisoner accommodation on the Hawkesbury River. After changing hands several times, the hull ran aground during gale conditions in 1933, and was left to rust. In 1973, the bow and stern sections were salvaged, and converted into memorials.

HMAS Huon

Huon was commissioned into the RAN in late 1915, and after completion was deployed to the Far East. In mid 1917, *Huon* and her five sister ships were transferred to the Mediterranean until a collision with sister ship HMAS *Yarra* in August 1918 saw *Huon* drydocked for the rest of the war. After a refit in England, *Huon* returned to Australia in 1919.

The destroyer spent several periods alternating between commissioned and reserve status over the next nine years, with the last three spent as a reservist training ship. *Huon* was decommissioned for the final time in 1928, and was scuttled in 1931 after being used as a target ship.

S Class destroyers

Fifty five "S" class destroyers were built for the British Admiralty under the Emergency Shipbuilding Program of World War I. *Tatoo*, *Stalwart*, *Success*, *Swordsman*, and *Tasmania*, along with the flotilla leader, *Anzac*, were gifted to the Royal Australian Navy (RAN) as replacements for the RAN's obsolete River class destroyers.

HMAS *Anzac*

This *Parker*-class destroyer leader served in the Royal Navy (as HMS *Anzac*) and the Royal Australian Navy (RAN). Launched in early 1917 and commissioned into the Royal Navy, *Anzac* led the 14th Destroyer Flotilla of the Grand Fleet during the First World War. In 1919, she and five other destroyers were transferred to the RAN, with *Anzac* commissioning as an Australian warship in 1920. Most of the ship's operations were confined to Australian waters, and she was decommissioned in 1931. The ship was sold four years later, stripped for parts, then towed outside Sydney Heads and sunk as a target ship in 1936.

HMAS *Stalwart* (H14)

was an Admiralty S class destroyer of the Royal Australian Navy (RAN). Built for the Royal Navy during World War I, the ship was not completed until 1919, and spent less than eight months in British service before being transferred to the RAN at the start of

1920. The destroyer's career was uneventful, with almost all of it spent operating along the east coast of Australia. *Stalwart* was decommissioned at the end of 1925, was sold for ship breaking in 1937, then was scuttled in 1939.

HMAS *Tattoo* (H26)

She was an Admiralty S class destroyer of the Royal Australian Navy (RAN). Built for the Royal Navy during World War I, the ship was not completed until 1919, and spent less than eight months in British service before being transferred to the RAN at the start of 1920. After arriving in Australia, *Tattoo* spent her entire career in Australian waters, and was placed in reserve on several occasions. *Tattoo* was decommissioned in 1936, and was sold for ship breaking in 1937. Some Sources indicate the remains of the hull were scuttled.

HMAS *Tasmania* (H25) was an Admiralty S class destroyer of the Royal Australian Navy (RAN). Built for the Royal Navy during World War I, the ship was not completed until 1919, and spent a year commissioned but not operational in British service before being transferred to the RAN at the start of 1920. The destroyer's career was uneventful, with almost all of it spent in Australian waters. *Tasmania* was decommissioned in 1930, and was sold for ship breaking in 1937. Some Sources indicate the remains of the hull were scuttled.

HMAS Success

Built in 1918 by W.Doxford, Sunderland. Placed in reserve in May 1930. Sold in June 1937 to Penguin P/L for demolition. Her remains were sunk by bombing as an aircraft training target off Sydney Dec. 20, 1941.

HMAS Swordsman Sold for demolition June 1937 to Penguin P/L. Scuttled Feb. 8, 1939.

Artwork by Kevin Antsis

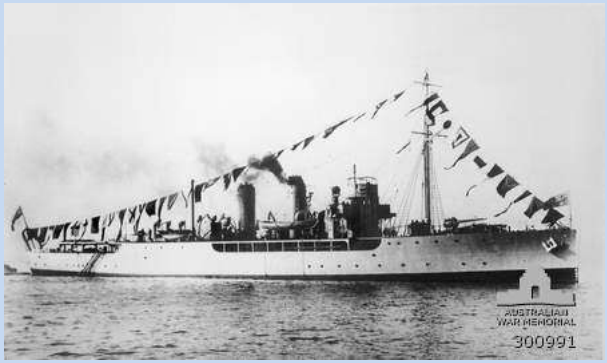
HMAS Mallow

Mallow was constructed by Barclay Curle at Glasgow in Scotland. She was launched on 13 July 1915.

During World War I, the sloop was tasked primarily with minesweeping. On the 31st of December 1915, Mallow picked up the bulk of the survivors of the SS Persia (1900) (which had been torpedoed the day before off Crete) and conveyed them to Alexandria. In 1918, *Mallow* rescued the passengers of the French Mailboat SS Djemnah,

including future acting Governor-General of Madagascar Joseph Guyon, after the mailboat was torpedoed by a German U-boat. *Mallow* later received letters of commendation from the Admiralty and Guyon. The sloop was transferred to the RAN in 1919. *Mallow* paid off to reserve on 18 October 1919, was decommissioned on 20 November 1925, and sunk as a target on 24 April 1935.

HMAS *Geranium* (formerly HMS *Geranium*)



She was an *Arabis*-class sloop built in Scotland and launched in 1915. The ship was operated by the Royal Navy as a minesweeper from 1915 until 1919, when she was transferred to the Royal Australian Navy (RAN) for use as a survey ship between 1919 and 1927. The ship was decommissioned in 1927 and scrapped during 1932, with the remains scuttled in 1935.

HMAS *Marguerite* was an *Arabis*-class sloop laid down for the Royal Navy by Dunlop Bremner & Company at Port Glasgow in Scotland in July 1915 and launched on 23 November 1915.

The ship was transferred to Australia in 1919 and commissioned into the Royal Australian Navy on 17 January 1920, receiving the prefix HMAS. *Marguerite* paid off on 23 July 1929 and was sunk as a target on 1 August 1935.

Cheap Boating Alternatives

Deep Coral Sea

An investigation of Australia's Coral Sea has revealed living fossils, rare corals and sponges unchanged for millions of years.

A team of Australian and German researchers sent a remotely operated vehicle (ROV) to a depth of 800 metres at Osprey Reef off the far north Queensland coast. The ROV was from the Centre for Marine Environmental Sciences in Bremen, Germany.

"Osprey Reef is one of most-dived locations in the Coral Sea, but diving only reveals the top thirty metres or so," said James Cook University's Dr Robin Beaman.

"The reef sits atop a coral bank that rises almost 1500 metres from the surrounding Queensland Plateau," JCU researcher Dr Tom Bridge said. "One of the attractions for divers is the sight of the sheer walls of the outer reef slope, disappearing into the depths, but until this expedition few people knew what was down there."

"At 800 metres the water is cold and dark, and the environmental conditions really haven't changed much for millions of years," Dr Beaman said.

"Between 800 and 450 metres, we found corals and sponges that aren't related to the species we see in the warmer waters up top," he said. "There are relict organisms that have survived in this area throughout the varying climate cycles of the Pleistocene, stretching back several million years."

, to a depth of 800 metres and then recorded its slow ascent to the surface, recording precise depth information for

Here, the researchers found large colonies of shimmering golden corals (of the genus Chrysogorgia) and precious red coral (Corallium) familiar to jewellery makers in other parts of the world, but never before found in the Australian tropics.

"What we saw in this deepest zone was very much determined by the nature of the substrate or sediment cover," Dr Beaman said.

"In areas of deep sand we saw species that spend most of their time buried in or crawling over the sand, and we were able to film their tracks and burrows.

"In other places, we saw glass sponges and bamboo corals growing on small rocks with a thin layer of sand – we were also able to film sea urchins, small crustaceans and spoon worms in those areas.

"But the most diverse communities, where we found the beautiful golden and precious red corals, were in areas where large rocks provided protection and niches for all sorts of marine life, including stalked sea lilies, crustaceans and gastropod molluscs."

Among the living fossils recorded are some species of glass sponge that are new to science.

"We were also able to film the chambered nautilus in a zone between 500 and 600 metres," Dr Beaman said. "The nautilus belongs to a very ancient family of cephalopods. We didn't know a lot about their habits, so it was exciting to see them at this depth."

Rising slowly towards the surface, the ROV revealed an eerily bare zone between 400 and 250 metres below sea level.

"It's a zone that's too cold for the tropical sea life we know so well, but it's too warm for the ancient life we found at greater depths," Dr Beaman said. "Around 200 metres, only very little sunlight penetrates and the ecosystem is dominated by black corals, hydro corals and soft corals."

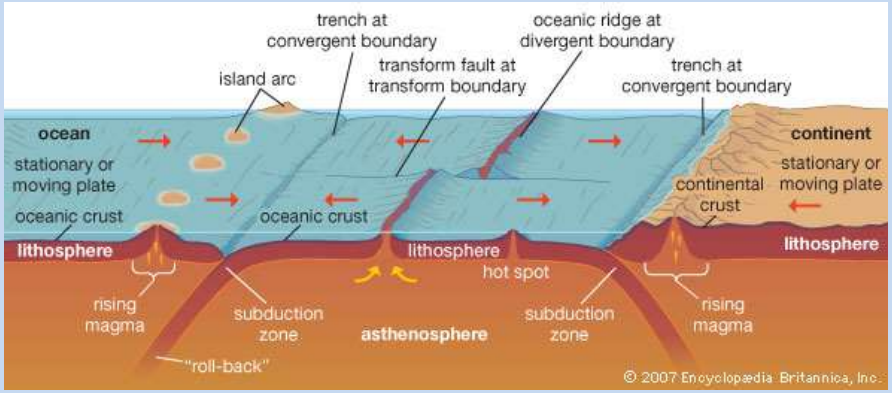
At around 120 metres below sea level, the ROV revealed another ancient secret. "In the reef's outer walls we found a series of caves likely formed by wave action. These caves mark the last ice age, about 20,000 years ago, when sea levels were 120 metres lower than today," Dr Beaman said.

"In addition to the excitement of seeing a previously unknown world, we now have a wealth of knowledge to help guide the conservation and protection of the Great Barrier Reef and the Coral Sea," Dr Tom Bridge said.

The video from the expedition can be viewed at:
http://ftt.jcu.edu.au/deepreef/temp/OspreyReef_Youtube.mov

Deep-sea or Oceanic trenches

Source Encyclopædia Britannica, Inc.



This term describes any seafloor feature that is a long, narrow depression in the seafloor in maximal depths from 7,300 to 11,000 metres depth. These trenches form in locations where tectonic plates are in contact and one plate slides under another. The trench forms an arc usually and can be dotted with undersea volcanoes. The are also the centre of big earthquakes and their resultant tsunamis.The deepest is the Mariana Trench in the western North. The longest trench is the Peru-Chile Trench, which extends some 5,900 km along the west coast of South America. Trenches are relatively narrow, usually less than 100 km wide.

Of the Earth's 20 major trenches, 17 are found in the Pacific basin. The Java Trench extends from northern Australia to the northwestern end of Sumatra. The New Britain and Solomon trenches, the New Hebrides Trench, the Tonga and Kermadec trenches are all found in our region.

Deep-sea trenches are V-shaped with steep sides. Narrow, flat abyssal plains of ponded sediment generally occupy the bottom of the trench. The bending forces will usually create a ridge of up to 1000 metres height close to the trench. This sometimes breaks the surface to create islands, as in the Java Trench.

A line of volcanoes often forms about 100 km from the trench. They can form active volcanic island chains, such as the Mariana Islands.

Some seafloor features are called trenches but they are not true ocean trenches caused by overlapping plates. The Diamantina trench (Diamantina Fracture Zone) extends westward from the southwest coast of Australia. It is a rift valley that was formed when Australia separated from Antarctica between 60 and 50 million years ago.

Trenches aren't usually filled with as much sediment as the moving plates draws old sediment into the Earth's crust. They tend to be filled with soils and ash from landslides along the trench walls.

In the immense pressures and total darkness of a trench it could be assumed that there is little life. Instead there are a vast array of very highly specialised creatures. We rarely visit trenches, but when we do we always find something new.

Boat Noise Advantages Predators.

An international research team has found that noise from passing motorboats increases stress levels in young coral reef fish. It also reduces their ability to flee from predators. Their survival chances are halved.

"It shows that juvenile fish become distracted and stressed when exposed to motorboat noise and predators capitalise on their indecision", said Professor McCormick. The team hope the findings will inspire better environmental noise management in coastal areas.

"We found that when real boats were motoring near to young damselfish in open water, they became stressed and were six times less likely to startle to simulated predator attacks compared to fish tested without boats nearby," said Dr Stephen Simpson, of the University of Exeter who led the study, funded by the Natural Environment Research Council (NERC).

They combined laboratory and field experiments, using playbacks and real boat noise, to test the impact of motorboat noise on survival of young Ambon damselfish during encounters with their natural predator the dusky dottyback.

"If you go to the Great Barrier Reef, there is a lot of noise from motorboats in some places. But unlike many pollutants we can more easily control noise. We can choose when and where we make it, and with new technologies, we can make less noise. For example, we could create marine quiet zones or buffer zones, and avoid known sensitive areas or times of year when juveniles are abundant," said Professor McCormick.

"You might argue that climate change is a bigger threat to reef life, but if we can reduce the effect of local noise pollution we build greater resilience in reef communities to looming threats such as global warming and ocean acidification," said collaborator Dr Mark Meekan, Australian Institute of Marine Science.