MARINE *Life*

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Amphibious Adventures

1804 Evans' first patented Amphibious boat - it

Our Goal

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

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Cover photo, *Michael Jacques, "William Pitt" Fortescue Bay Tasmania*

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worked

On May 13, 1958, Australian Ben Carlin completed a 10-year journey to drive around the world. Using a modified Ford GPA *Half-Safe*, he travelled 17,780 km by sea and 62,744 km by land, starting and ending in Montreal, Canada. This is the only documented circumnavigation of the earth by amphibious vehicle. In 1981, *Half-Safe* was acquired by Guildford Grammar, Perth, where it remains on display.

NEW Commonwealth MPAs Protection Reduced

The Federal Government's revised plans for 44 new Australian marine parks, almost halves the size of protection zones.

Under the new proposal, mid-water trawling will be allowed and more areas will be opened to commercial and recreational fishing.

The plans cover Commonwealth waters off the coast of New South Wales, Queensland, Western Australia, South Australia and the Northern Territory starting about five kilometres offshore.

In 2012, the then-Gillard government expanded the network of marine reserves but they were suspended by Tony Abbott, who ordered a review. The new draft plan was released in July.

The Coral Sea off Queensland, is considered the most contentious, it is important to fishermen and is home to more than 40 highly biodiverse reefs like Flinders Reef, which are a haven for marine life.

Diving operator Craig Stephen said the Osprey, Holmes and Flinders reefs in the Coral Sea were crucial areas, particularly for sharks. "None of these reefs have been offered any real protection," Mr Stephen said. There's [an] amount of protection at Osprey reef, which is an iconic reef, but the other reefs for the most part have been left exposed to extractive practices. There is no balance — the balance is in favour of extractive practices."

Pavo Walker owns the largest wild-caught tuna fishing operation in Australia, based at Mooloolaba on Queensland's Sunshine Coast, and relies entirely on the Coral Sea to survive. "The 2012 … model would have seen a complete end to our fishery and our industry and we are talking about a world gold standard sustainable fishery that would have been closed for emotional reasons, not scientific," Mr Walker said.

Daniela Ceccarelli,

At the time of the original announcements, the ALP was criticized. Overall, the no-take zones were often in areas least in need of protection, generally in the deep ocean. Before the Abbott review had heard evidence it was clear that fishing areas would be excluded from what was left of the contentious protection zone boundaries, which is what has occurred.

Some reefs have less protection than before, and some have more. Notably, two of the most important reefs in the Coral Sea – Osprey and Marion – are partly open to fishing and partly no-take. Split zones are known to pose problems for compliance and are typically avoided in conservation planning.

The review's Expert Scientific Panel (what do you know Bob Beeton and Col Buxton once again added their 'independent' voice to this MPA cut) assessing the "performance" of the Coral Sea Marine Reserve in ways that are simply "uninformative and distracting" according to critics. No-take zones in areas with no fishing often make little contribution to conservation.

For instance, one of the measures used by the review was to add up the number of conservation features (such as seafloor types) in proposed reserves. Many of these features don't need protection, others are affected to varying by fishing, and often we don't know how much of each feature needs protection.

Another approach is to assess the amount of protection needed for species and other conservation features, considering distinctiveness, threats, and reliance on Australian waters for their persistence. It is argued this is a more conventional method.

Such an approach was used in the Great Barrier Reef rezoning in 2004, but has been avoided elsewhere in Commonwealth waters to maximise fishing resources.

If you want to see the other side of the argument, go to https://theconversation.com/the-story-behind-australias-marine-reserves-and-how-we-should-change-them-65220

Shark nets back in NSW and QLD but under fire

Shark nets will again be deployed on the New South Wales north coast, despite environmentalists warning they are killing an unacceptable number of dolphins, turtles and endangered sharks.

State government already deploys sunk nets at 51 beaches between Wollongong and Newcastle in about 10 to 12 metres of water, within 500 metres of the shore. Last year the State Government trialed them at five beaches near Ballina and Evans Head.

The results of the trial are not yet public, but on Friday the state government announced it would run the trial again this summer.

Last season, 279 of the 373 marine animals caught in the nets were not dangerous sharks. Fifty-six were endangered or vulnerable marine species. The nets caught 98 largely harmless and non-targeted sharks, 165 rays, five marine mammals and 10 marine reptiles. Six critically endangered and harmless grey nurse sharks –were killed by the nets.

The Queensland Government's long-running shark control program on the Great Barrier Reef will be tested in court by an animal welfare group. Humane Society International (HSI) has launched legal action in the Administrative Appeals Tribunal against the Great Barrier Reef Marine Park Authority (GBRMPA). Earlier this year, it issued a 10-year permit to the Queensland Department of Agriculture and Fisheries to kill sharks using drumlines near 85 popular beaches along the reef. The shark control program has been happening since the 1960s.

In recent years, it has stopped using nets as a control method, which GBRMPA had previously argued reduces the risk of marine by-catch, such as turtles.

"The appeal is based on the public interest in protecting the biodiversity of the Great Barrier Reef Marine Park.

"HSI is calling for non-lethal alternatives for bather protection.

Searching for the 'Goldilocks' oyster

Source ABC News

Marine scientists in New South Wales were working to understand climate change impacts on oysters. They are now shifting their focus to understanding how oysters could be resistant to climate change effects by selective breeding.

The research has been a collaboration between University of Sydney's Dr Laura Parker and Professor Pauline Ross, and Dr Wayne O'Connor from the DPI's Port Stephens Fisheries Institute.

The 'normal' level of pH in the ocean is 8.2, but by the end of the century, due to climate change, the pH level is forecast to be 7.9.

Dr O'Connor said their breeding program had produced over 200 families of oysters with various traits. "We follow the performance of those families for things like growth, survival, shape, and their meat condition. Then we can select from those families to produce oysters that combine the characteristics most useful for industry," he said.

Wild oysters were firstly grown in conditions simulating climate change — reduced pH levels and increased water temperature. Wild Pacific and Sydney rock oysters were adversely affected by climate change conditions with reduced fertilisation success, developmental abnormalities, and reduced growth reported.

When fast-growing oysters from the DPI's selective breeding program were tested, they were found to have better resistance to climate change conditions.

"It's to do with the way they grow their shells. One of the main impacts of reduced pH is that it's much more difficult for an oyster to lay down their shell and to maintain that shell.

"These oysters that had already been selectively bred for faster growth, they're already putting much more energy into their shell growth and are better at doing that.

"We think that's one of the reasons why they were able to grow better under those reduced pH conditions."

(ABC News: Kim Honan)

"Those series of experiments told us that we could actually breed or create some more resilient oysters, even in the wild [population].

"However, the next experiment told us when we put them into multiple stressors that are in an estuary — reduced salinity, increased temperature [that we expect under climate change] — their offspring may not do as well.

"It ends up being a bit of a complex story. We can create more resilient oysters, but then there's trade-offs." "I think we're never going to find the 'Goldilocks' oyster that is the best at everything ... [but] I do think we are going to be able to find oysters that are right for the environment that we need to put them in and that do have the traits that we need them to have."

Coral bleaching everywhere in Pacific Ocean

Scientists aboard the French research ship "Tara" have seen coral bleaching across the Pacific Ocean.

The vessel Tara has been sailing around the globe for more than a decade to study the effects of climate change on the ocean.

On a stopover in Sydney, captain Nicolas De La Brosse said the extent of damage is already deeply troubling.

"What we've seen in really isolated spots like Samoa for example, even though it's very far away from [developed] countries with pollution, we struggled to find any coral life," he said. Mr De La Brosse said nowhere was immune to the effects of global warming. "It doesn't matter where you are in the Pacific, coral is starting to bleach."

He said data was still being collected and analysed and the final results would be released at the end of 2019.

The ship is not just a floating science lab — it is a temporary home for 16 people, including engineers, scientists, sailors, crew and, of course, a cook who whips up French dishes and sometimes, local favourites.

After its Sydney stop the ship will head north to study the extent to which coral in the Great Barrier Reef is adapting to climate change.

Molly on the Move

The Year 4 student from Cairns has started a campaign to rid the Great Barrier Reef of single-use plastic straws.

Molly's "Straw No More" campaign has been taken up by more than 10,000 students.

It all began when Molly saw a showing of the documentary, "A Plastic Ocean" with her mother.

"All my life I've loved turtles and turtles are most affected by plastic.

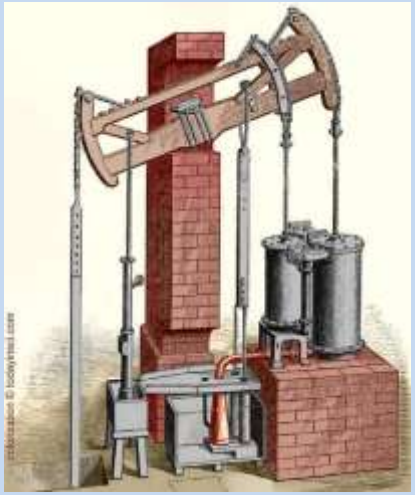
Molly's stopped using plastic straws, "Then I convinced my friends at school to stop and then I also started talking to friends at other schools and my tuckshop too," she said. Now 16 schools across the state have joined the Straw No More campaign.

"Don't use straws or else I will hunt you down," she joked.

Researchers believe there is up to 236,000 tonnes or 51 trillion plastic particles in our oceans, slowly poisoning our oceans and our food supply.

Shipwrecks and their Compound Steam-Engines

First successful version 1853



The following was read at an 1853 meeting of the New South Wales Society of Engineers, by Mr. Dowling.

"The compound engine is a condensing engine, employing the steam expansively, but differing from the ordinary or single cylinder engine, in its having more than one cylinder in which the expansion is to take place. There are instances of compound engines having three or more consecutive cylinders, but our attention this evening will be confined to the ordinary arrangement or form, wherein the steam is expanded in two consecutive cylinders, relatively large and small; the small cylinder is commonly called the high, pressure cylinder, and receives its supply of steam direct from the boiler. The larger one, called the low pressure cylinder, receives its steam from the exhaust of the small one, and itself exhausts into the condenser…"

"The compound or double-cylinder engine was invented by Mr. Jonathan Hornblower, an engine builder in Cornwall, about the year 1776, and was patented by him in 1781. At this time much success was attendant on the improvements of Mr. Watt, and … the low pressures of steam then available, and for other reasons that we shall presently see, his engines did not equal in duty the single acting engine of Watt; they also required the condenser, which Watt at that time had just patented ; so that compound engines were beaten from the field almost as soon as invented.

Woolf erected his first double cylinder engine at Moux's brewery, in 1806, and had great success for some years, erecting many pumping and other engines, whose performance exceeded all the single cylinders.

All this time great improvements, it must be remembered, were being made in the single engine, for Trevithick proposed his Cornish boiler in 1804, and put up one in 1812, which proved its superior efficiency ; and as the pressure was increased, the single engine performance gradually overtook the compound ones, and for the second time the compound principle was beaten.

The Thames penny boat, the Cricket, whose boiler exploded under such peculiar circumstances, had compound engines by Joyce, of Greenwich, put in in

1816, but they were more tolerated than appreciated, and little or no real practical progress was made with them for some years.

About 1854, Randolph Elder and Co., of Glasgow, constructed their first compound marine engines, and the late Mr. John Elder, of that firm, spent many years in perfecting them. Rowan's patents were also taken out, and, combined with his boiler, gave as high indicated results as have ever yet been obtained ; and by 1862 marine engineering may be said to have been revolutionised, for at the Exhibition in that year compound engines were the rule rather than the exception, and were exhibited by most of the leading firms, generally in combination with the surface condenser; and from that time to this they have continued to grow into favour, and have now firmly established their reputation.

When Hornblower first began his experiments with compound engines, engines were only just getting out of the days of cast iron boilers. And, although at the present time, cast iron boilers are being made and used for high pressures, they are of a different nature and construction to those used a hundred years ago…"

The screw steamer "Admella"

" the unanimous conclusion of all is that she is a very beautiful specimen of naval architecture".

"Her hull, sitting gracefully on the water, is very long and low: and forward the bow is terminated by a skillfully carved female figure, crowned with a wreath of wheat, the ears of which form a tiara to represent the cereal productions of the colonies. The stern is elliptic, and considerable taste has evidently been displayed in the ornamental finish of the carvings, with which it is plentifully decorated".

"The main saloon, which is 44 feet long, is furnished with telescope dining-tables extend down the centre, made of Spanish mahogany, highly polished. On each side are fitted settees with folding backs, so as to be available for seats both sides by merely throwing over the back-rail".

"The panelling round the cabin is composed of plate glass, in some places exhibiting views from various parts of Scotland, as well as one or two scenes, the subjects of which are taken from the neighbouring colony of Victoria, and in others mirrors so disposed as to produce a very pleasing effect. The ceiling is painted white, and-the mouldings being gilt, a very pleasing contrast is produced, which is, if possible, heightened by the imitations of satin and rosewood- with which the pilasters are painted".

"The engine space is constructed on an entirely new principle the machinery occupies the after portion, the boilers being placed forward. The space between is filled by the coal bunkers, extending transversely across the vessel, and capable of containing 100 tons of coals, or a sufficient stock for seven days' steaming.

The engines are described in the specification as a pair of approved geared engines of 100 horse-power nominal… ".

"The boilers are of approved make, on the tubular principle, fitted with all the recent improvements in gauges, safety-valves, and salmometer, and are capable of sustaining a pressure of 35- lbs. to the square inch (water pressure)... The whole of the machinery was supplied by Messrs. A. & J. lnglis, Whitehall Foundry, Glasgow, and from its workmanlike finish, reflects great credit on the firm."

SS Admella was an Australian passenger steamship that was wrecked on a submerged reef off the coast of Carpenter Rocks, South Australia, in 1859. Survivors clung to the wreck for over a week and many people took days to die. With the loss of 89 lives it is one of the worst maritime disasters in Australian history. Of the 89 dead, 14 were children.
The remains are badly broken and scattered on a reef. The engines, boilers, iron plating, copper ingots and her fittings can be seen lying amongst the reef. It is rarely dived due to an almost unceasing swell.

Coffinfish

Source CSIRO

***Coffinfish were recently collected in the Flinders Commonwealth Marine Reserve by the CSIRO RV* Investigator**

This fish belongs to a group of deep-sea anglerfishes, Chaunacidae, which live on muddy or rocky seafloors around the world.

Most species of coffinfish are found on the continental slope in depths to 2000 metres, although some occur in much shallower. Most only reach 20 cm or so.

Coffinfishes are usually pinkish, reddish or orange, sometimes with greenish, yellow or brownish markings. Their round flabby bodies taper to a small tail, and are densely covered in tiny spine-like scales giving them a fuzzy or velvety feel. Those prominent lines on the head and body are sensory canals used to detect the movement of nearby predators and prey.

They are 'sit and wait' ambush predators and have the first dorsal-fin spine on the head modified into a fishing rod, tipped with a lure that can be waved around to attract prey. Coffinfishes have a very short 'fishing rod' positioned just behind the snout and a mop-like lure that can be folded back into a shallow pit between the eyes when it's not being used. They prey mostly on other fishes and crustaceans.

While they can and do swim, coffinfishes are definitely not built for speed. Instead, they usually walk or amble over the seafloor using their arm-like pelvic and pectoral fins that look a bit like paddles. When threatened, they can defend themselves by inflating their bodies with water making it much more difficult for a predator to swallow.

About 10 coffinfish species are known from Australian waters, including some that are yet to be formally named and described.

Coastal Wetlands Dead in 80 Years?

Modelling done by an international team of researchers who have worked sea level rise suggest wetlands are in increasingly deeper trouble.

The University of Newcastle fed in the likely effect on tidal movements of man-made structures like roads, culverts and bridges and how they will add to sea levels rise. The modelling estimates a 50 per cent increase in the estimated rate of loss of wetlands.

This causes increased inundation, drowning wetlands and salt marshes, "Both mangrove and salt marsh need a particular wetting and drying regime both in terms of time and depth of inundation," Dr Rodriguez said.

"When we build a road across a wetland, the tide is forced to move from one side of the road to the other through culverts or bridges instead of freely flowing over the tidal flat," Associate Professor Patricia Saco said. "As a result, it takes more time and energy for the water to reach the other side. This results in water sitting in the wetland longer … then at low tide, some areas of the wetland are not able to fully drain resulting in ponding."

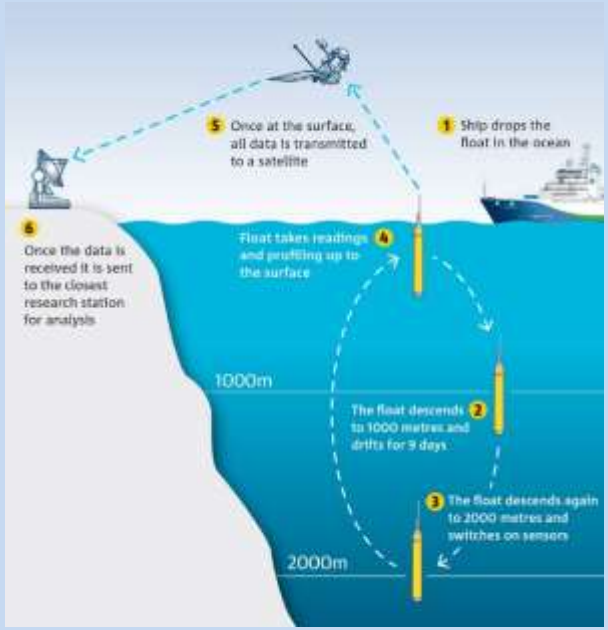
"The impacts are going to start showing earlier, between 40 and 60 years from now. We'll see considerable changes in the vegetation distribution."

In the NSW Hunter region, wetlands within one kilometre of the coast could disappear in 80 years, but it will be different in other areas.

Wetlands and salt marshes are a haven for bird life.

The areas are also important for the breeding of crabs, bats, marsupials and fish.

The vegetation can move in line with environmental changes if there's space further up the system. "Either industrial or urban development tend to be at the upper end of the tidal range, so if sea level rises the salt marsh will not be able to move up the topography in order to get a better position because there's going to be development there."



World's Oceans infested with robots

A network of robotic Argo floats is increasing our knowledge of the oceans and the world's climate

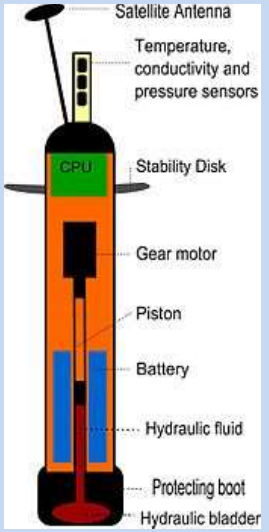
The oceans store vast amounts of heat. Three metres of ocean has the same heat capacity as the entire atmosphere, so it plays a large role in understanding climate change.

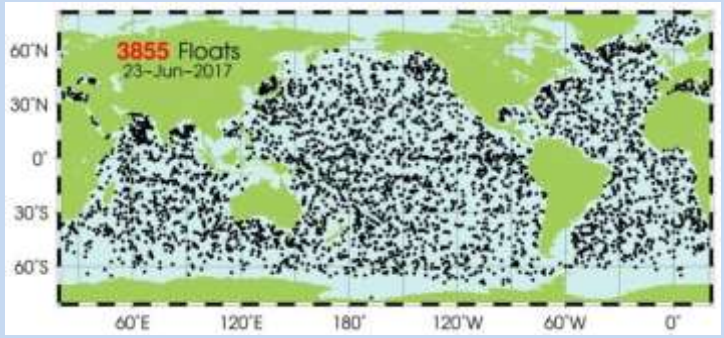
The CSIRO are part of a major international effort to improve our understanding of the ocean through the use of a global array of robotic floats, known as Argo floats. You can have a team of divers collecting 24/7 results to 2000 metres, so it has to be done by robots.

Australia launched the first ten Argo floats in the Indian Ocean in 1999. There are now thousands of Argo floats in operation world-wide.

Argo robotic floats can be deployed from research or commercial ships, and also from aircraft. The floats drift at depths of between 1 and 2 km, before ascending to the surface every ten days, measuring temperature and salinity as they rise. The data are then transmitted , before the float dives and starts a new cycle.

CSIRO Oceans and Atmosphere division operates Argo Australia, which is a component of the Integrated Marine Observing System IMOS. Argo floats are deployed, real-time processed, and delayed-mode processed at the CSIRO.





What lives on the seafloor of Antarctica?

Primary Source AAD

New Harbor, McMurdo Sound. Main visible species include; the antarctic scallop, antarctic sea urchin, a stalk-like bush sponge, a brittlestar, seaspiders NSF/USAP Steve Clabuesch

There is much more life hidden In Antarctic depths than what is seen at the surface.

The seafloor is diverse, with well over 8000 species discovered, and scientists are constantly finding more. Parts of the seafloor around Antarctica are nearly as diverse as our tropical reefs.

Many of the animals in Antarctica are gigantic versions of the species that occur in more temperate waters. This may be because many of the predators that are common in warmer waters don't like the cold. There are no sharks, and not many shell crushing animals like crabs and lobsters. The main predators are slow moving starfish, sea spiders and ribbon worms. Antarctic fauna is very different from other parts of the world, with lots of soft bodied animals such as crustaceans, molluscs, sea stars, brittle stars, sea cucumbers and worms.

Hard surfaces, such as a boulder, become covered in a diversity of organisms, such as urchins, brachiopods, soft corals and the sponges.

Recent voyages have investigated the seafloor communities that live on steep slopes off the continental shelf and within canyons. Canyons are high energy environments that become funnels for nutrient-rich waters. Often the critters that are found in canyons are those that like strong currents, with food particles flowing past them in the water. There are also often more hard surfaces for animals to attach to within canyons. Between the canyons there are areas with low currents where softer sediments become deposited. These areas contain those animals that need to burrow and crawl around in the sediments.

A diverse community of hydrocorals, sponges, bryozoan, brittle stars and soft corals was found within seafloor canyons at a water depth of 725m on the George V margin in 2008. The high diversity and vulnerability of these communities resulted in the area being protected from bottom fishing.

The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) is responsible for protecting Antarctic marine life. Some of the measures that they have put in place to achieve this include banning bottom trawling and long line fishing in waters shallower than 550 m. There are also specific areas, where an exceptional diversity of vulnerable marine species have been found, and these are protected from fishing

Large parts of the Ross Sea have recently been protected, conserving large areas of the ocean and all the animals (and algae!) that rely on it, including marine mammals, penguins and other seabirds, fish, krill, phytoplankton and all of the seafloor animals. The establishment of Marine Protected Areas for East Antarctica is currently being considered by CCAMLR.

Slight Warning in Antarctica May Cause Extinctions

Photos: Gail Ashton

A single degree of warming in the shallow waters off the Antarctic Peninsula could significantly benefit some species at the expense of others.

Experiments show that a one degree change in water temperature nearly doubled the growth of one tiny marine invertebrate. It points to extensive changes to shallow water Antarctic communities if oceans in the future, even though humans have little direct impact on the continent presently.

Researchers placed heated panels on the sea floor and monitored the growth of species on the panels over nine months.

While the panels only warmed the water a few millimetres above the panel surface, it was enough to trigger major changes in the communities.

"There was one species that really dominated that cover … that really took off with the warming, and managed to cover over the panels," said the study's lead author Gail Ashton, from the British Antarctic Survey and the Smithsonian Environmental Research Center.

The panels represented the predicted water temperature increases for the region over the next 50 and 100 years.

A rise of 1C nearly doubled the growth of *Fenestrulina rugula*; a tiny filter-feeding marine invertebrate.

"You can imagine that one species taking over the whole space and rarer species wouldn't be able to compete with that," Dr Ashton said.

Another species — the marine worm *Romanchella perrieri* — showed a 70 per cent increase in territory compared to the panels that were kept at ambient temperature.

At 2C above ambient water temperature, the winners and losers were less clear-cut, and there was more variation in growth patterns on the panels.

"So have we maybe just pushed some of the individuals within the species to the level where they can't cope; some are able to maintain that increased growth whereas others just aren't able to cope with that change," Dr Ashton said.

Commenting on the study, marine biologist Jonny Stark from the Australian Antarctic Division suggested the 1C-2C increase might represent the upper limit that these organisms can cope with.

He pointed out that while this study limited the temperature change to a small increase, other studies suggest higher temperatures have more serious effects.

"It could place a lot of these animals at the upper end of their envelope of tolerance," he said. "Beyond that, we're not really sure what would happen. You could see some catastrophic differences."

Restoring Shellfish Reef

Shellfish reefs are the most threatened marine habitat on earth: 'Globally, 85% of oyster reefs have been completely lost and there are signs that reefs are 'functionally extinct' in many areas, particularly in Australia.

Australia once had extensive shellfish reefs across its coastlines and NESP Marine Biodiversity Hub researchers from James Cook University (JCU) and The Nature Conservancy (TNC) have identified what needs to be done to repair and conserve them.

Their report describes eight shellfish reef habitats formed by oysters, mussels and pearl oysters in Australia. Only two of the eight have been researched in any detail.

Research will now focus on measuring the potential benefits of shellfish reef restoration and describing where remnant shellfish reefs survive to help identify where restoration may still be possible.

Shellfish reefs - formed by dense aggregations of oysters and mussels - were documented by early maritime explorers such as Cook and Flinders Vancouver. They regularly referred to extensive shellfish reefs, some stretching for kilometres along shallow bays.

Vast quantities of oysters and mussels were harvested for food and as a source of lime for mortar in early roads and buildings.

The harvesting of oysters was one of Australia's largest maritime industries in the 1800s and early 1900s. Overfishing, pollution and disease have largely destroyed these reefs and the last major natural oyster fishery closed by 1960s.

Now it is estimated that less than one per cent of Australian shellfish reefs remain.Australia's reef-forming shellfish species are:

- Pacific oysters *Crassostrea gigas*
- Leaf oyster *Isognomon ephippium*
- Blue mussel *Mytilus (edulis) galloprovincialis*
- Native flat oyster *Ostrea angasi*
- Pearl oyster *Pinctada albina sugillata*
- Coral-rock oyster *Saccostrea cucullata*
- Sydney rock oyster *Saccostrea glomerata*
- Hairy mussel *Trichomya hirsute*

These reefs can filter huge quantities of water, produce large amounts of fish and harbour unique plant and animal communities and the restoration of shellfish reefs will provide future generations with clean water, more fish to catch and new recreational opportunities," said Dr Chris Gillies.

Carnivorous Sponges

Source CSIRO

Carnivorous sponges predators only five to 15 centimetres long.

Three carnivorous sponges found in the beam trawl on the RV Investigator *voyage to Australia's eastern abyss. From left to right:* Cladorhiza, Abyssocladia, *and something referred to affectionately as 'sponge on a rope'. Images: Karen Gowlett-Holmes*

Sponge spicules.

They are silicon based, so their bodies are stiffened by threads or spicules of pure silicon (glass) spicules ranging from the microscopic to ones up to a metre long. The CSIRO have collected species of *Abyssocladia*, sponges and *Cladorhiza*. These types of sponges have been reported previously to be carnivorous. They get small crustaceans hooked on their Velcro-like spines to be slowly digested. Other deep-sea sponges feed on bacteria and other single-celled organisms filtered from passing currents.

Australian Guano Islands

By 1840, farmers all over the world realised how much phosphate fertiliser from bird droppings (guano) could increase crop production. It became the latest 'wonder product' and a world wide rush to find deposits ensued.

They had to be islands with millions of seabirds and with low rainfall to preserve the phosphates. Guano was mined heavily from Peruvian islands where deposits were sometimes 30–50 metres deep. Britain was Peru's largest market for guano, with trade of about 20 million tonnes between 1840 and 1880.

Much of the mining was performed by African slaves and Chinese labourers. Among the terrible conditions that they had to endure was ongoing exposure to airborne guano dust, which caused severe respiratory problems. Slavery was not abolished in Peru until 1854.

A Peruvian monopoly on guano made it very expensive so any discovery in in Australia caused a lot of excitement.

Australians searched their own tropical islands vigorously, but Australia had relatively few seabirds and shallow guano deposits. The mining that did occur damaged many island ecosystems in the process.

Within just 50 years, world guano reserves were substantially exhausted. Industrial production turned to electric arc production from phosphate rock found in many places, including Nauru and Christmas Island.

Southern Coast

Lawrence Islands

All along the Australian coast men searched for guano. In the south the Lawrence Islands near Portland were mined. In 1854 the Tasmanian vessels Union, Flying Squirrel, and Scotia were employed taking guano, which was sold in Hobart Town at £8 per ton. A report states that there was a great quantity of guano, which was filled into bags and so loaded into open boats, from a platform about 18 feet above a rocky ledge.

The recovering gannet colony at Portland, Lawrence Rks is partly visible offshore

Lawrence Rocks is the nesting site and rookery for many seabirds including over 6,000 Australasian gannets, 10% of the bird's total population. The rocks are also a haul-out site for Australian fur seals.

The island is also a hot spot for divers. The northern side rises from about 24 metres but the thin ledge around the island can drop into depths of as much as 45 m on each side, with 70M depths being found on the exposed side. These deeper reef sections are noted for colourful sponge gardens, big schools of pelagic fish and delicate invertebrate animals. A series of gutters, ledges and swimthroughs in 7-18m boasts prolific fish life.

Lady Julia Percy (Deen Maar) Is

Guano was also mined on nearby Lady Julia Percy Island until 1861. The guano was brought to Port Fairy on barges.

Deen Maar (Lady Julia Percy Is) from the Crags SW Vic.

Lady Julia Percy Island is home to Australia's largest fur seal colony of around 25,000 Australian fur seals.

The island is home to breeding little penguins (2000 pairs), common diving-petrels (1000 pairs), fairy prions (1000 pairs), and short-tailed shearwaters (15,000 pairs).

The 1936 McCoy Society expedition noted, "A century ago it was covered with a dense, almost impenetrable, growth of the mixed bushy scrub that characterizes certain parts of the coast of the adjacent mainland. Some sixty years ago this dense scrub was still standing over the major portion of the island; but to-day the whole of the plateau is devoid of any growth more majestic than bracken fern and thistles. The whole plateau is, at present, a windswept area, clothed only by vegetation knee-high at the best, and at the worst, by loose volcanic soil or bare rock. This denudation of forest cover is due to human interference, for pigs were at one time turned down on the island, rabbits were liberated and are still living in their thousands, and sealers, fishermen and guano workers have cut down and burned the stunted and wind-blown trees that formerly covered the island."

Pigs and rabbits were previously introduced but have since disappeared or been eradicated.

Access to Lady Julia Percy Island itself is restricted, and landing is by permit only. However, boat cruises from Port Fairy to the waters around the island are popular; they allow people to see the seal colony and watch whales and seabirds on the way.

Seaplane holidays

Source Frank Stamford

The flying boat service from Sydney to Lord Howe Island was the last regular use of large flying boats anywhere in the world.

Flying boats were designed to take off and return to the surface only on water. At a time when there were few airfields that was an advantage.

Short Brothers in England designed the Empire flying boat for long distance luxury international flights, such as Australia to England. Their main purpose was to carry air-mail. The service, starting in 1938 was short lived as the Second World War started a year later. The flying boat design was militarised as the Sunderland, which became an important anti-submarine patrol aircraft.

World War II lead to the construction of numerous airfields throughout the world and after the war floatplanes only survived servicing small islands like Lord Howe.

The war also created an excess of war-surplus military aircraft and between 1946 and 1948 Short Brothers converted 27 Sunderland Mk V aircraft into a civilian aircraft called the Sandringham. Trans Oceanic Airways commenced the first commercial passenger service to Lord Howe Island in 1947, followed a few months later by QANTAS Airways. Catalina and Sandringham aircraft were used for this service. Ansett took over the service in the early 1950s.

There were up to six flights per week during the busy season. Flights were timed to arrive an hour before high tide to ensure take-off on the full tide. A falling tide easily grounded the larger floatplanes in the shallow lagoon and there was a big rush to unload. One fellow I ran in to recently, recalled how the pilots had to leapfrog over coral heads under full power if the departure wasn't well timed.

This wasn't a Jetstar cattle boat, the aircraft were spacious and fitted out with a large galley. Passengers felt like VIPs and this was reflected in the ticket price.

There were inevitably accidents. Catalina VH-EAX was driven ashore in a gale on 23 June 1949. The remains from this aircraft were partly salvaged. One wing was transported to Neds Beach and used as fill to stabilise erosion under the present-day shelter near the main beach access.

The other significant remains of this important era left on the island is the wreck of the ANSETT Airways Short Sandringham flying boat, Pacific Chieftain (VH-BRE). This aircraft was also driven ashore within the lagoon on 3 July 1963. Beyond repair, the aircraft was salvaged for useable parts, towed to sea, holed with hand axes and sunk off the North Passage.

By 1974 the operation of flying boats had become uneconomic. A 1,000 metre airstrip was constructed by Australian Army Engineers and land aircraft took over the air service to the Island.

The flying boat *Beachcomber* escaped destruction after an unplanned stranding and was taken to England in 1980. She now rests in the Southampton Hall of Aviation [*one for you Renfree*], still marked in Ansett colours.

Happy moments

Fishes of Australia, Fishingworld

The name of this fish is a bit of irony from anglers. There are at least 2 species of *Siganus* in Australia that fishers refer to as "happy moments", the dusky or black rabbitfish (*Siganus fuscescens*) and the forktail rabbitfish (*Siganus argenteus*). The happy moment fish is one of many Australian fish with venomous spikes in their dorsal fin. The spike can introduce some venom, cause a lot of the pain, and also introduce bacteria and cause a nasty wound," he said.

The happy moment fish is also known as the rabbit fish, black trevally or stinging bream and has a distribution around the entire continent. The best pain relief for the stings is hot water.

Both species occur throughout the tropical and subtropical parts of the country, with black rabbit fish extending its range further south to around Fremantle on the West Coast and southern NSW on the East Coast.

Happy moments almost entirely herbivorous, feeding mainly on algae. They are most often caught in cast or bait nets. A study in Moreton Bay in Queensland examined whether happy moments actively fed on a bloom of the toxic filamentous cyanobacteria *Lyngbya majuscula*, in order to see whether these fish could be used to clean up nuisance algal blooms. Scientists found that the happy moments ate the *Lyngbya* algae, but only when the active toxin was not detectable.

They are fast growing, reaching 20 to 25cm in their first year in tropical waters, and reach a maximum size of around 40cm. They mature in their first year of life, females produce around 300,000 eggs and may spawn more than once a year, so they are relatively resilient to fishing pressure. They form the basis of important commercial fisheries and aquaculture industries throughout Asia and Japan.

If you are part of a large and diverse community of organisations and individuals involved in Australia's coastal zone, This conference is an essential part of your calendar. Interesting guest speakers and a lot fascinating things to learn.

Handfish to be Bred in Aquarium

Source CSIRO, Dr Tim Lynch

Spotted handfish (Brachionichthys hirsutus) are a type of anglerfish that prefer to walk on their fins along the seabed rather than swim.

Handfish were once abundant around the globe but are now only found in waters off south-east Australia, with most species endemic to Tasmania. "It's a fantastic place, Tasmania. It's a bit like Madagascar — there's lots of strange and rarer animals here," said Tim Lynch, senior research scientist at CSIRO.

"[The spotted handfish] have the dubious distinction of being the first marine fish to be listed as critically endangered back in 1996."We thought with the decline of the handfish, at this moment while there's still some, it would be prudent to get some captive populations going for insurance purposes," Dr Lynch said.

Three spotted handfish were collected from the River Derwent off the shore of Battery Point and taken to a tank at the CSIRO a few metres away and are already breeding.

Bird Life Tasmania News

Little Penguins at Bicheno battling weeds

BirdLife Tasmania recently submitted a report to Glamorgan Spring Bay Council from surveys of Little Penguins at Bicheno. The report provided Council with the results of foreshore penguin mapping efforts and recommendations regarding the rehabilitation of foreshore vegetation that Council is undertaking. Extensive areas of mirrorbush and other foreshore weeds such as sea spurge are being removed and the coastal areas rehabilitated. The foreshore vegetation provides shelter for the penguins as they move between their nests and the sea, and Council efforts are focussed on improving these foreshore areas.

Prosser River 'stabilisation'

Dredging of the mouth of the Prosser River at Orford has commenced. Marine and Safety Tasmania (MAST) is responsible for the 'stabilisation' project that will see more than 20 sand-filled geotextile bags used to form a new river mouth. BirdLife Tasmania approached the federal Department of the Environment to become involved as there are several species protected under the EPBC Act breeding on site. Our submission to the federal government drew on almost 70 years of data, highlighting the national significance of the site for resident shorebirds and small terns. The Tasmanian government's plans were revised in light of our data and the advice of the federal government.

Dodo Partly Comes to 'Life'

Native to the island of Mauritius in the Indian Ocean, the dodo was wiped out in the 17th century after the arrival of Dutch sailors and the animals that came with them.

But, despite historical sighting records little is known about the birds. Now researchers have managed to fill in some of the gaps.

Thin cross-sections of 22 recovered leg and wing bones, thought to be from 22 different dodos, were examined under a microscope. "For the first time we can say that for sure these specimens are juvenile, even if it looks like it is almost an adult in terms of size," The results showed that the chicks grew rapidly after hatching.

"When birds moult they use calcium from the inside layers of their bones to build new feathers, leaving telltale holes in the internal bone. For these specimens we can say that they died when they were actually moulting," said Angst.

The researchers believe that differing historical descriptions of the dodo are not wrong, but describe the birds at different phases of the moulting cycle.

Mariners who described the birds as having a downy plumage probably saw them just after moulting began, with those describing dodos as sporting grey or black feathers seeing them between periods of moulting. The moulting happened just after the summer.

Though the dodo has historically been considered fat and clumsy, it is now thought to have been well-adapted for its ecosystem. It used gizzard stones to help digest its food, which is thought to have included fruits, and its main habitat is believed to have been the woods in the drier coastal areas of Mauritius. Its closest genetic relative is a pidgeon. It is presumed that the dodo became flightless because of the ready availability of abundant food sources and a relative absence of predators on Mauritius.

Dutch sailors started hunting it in 1599, while its habitat was being destroyed. The last widely accepted sighting of a dodo was in 1662. A large amount of subfossil material has been collected on Mauritius, mostly from the Mare aux Songes swamp

Albatross hitchhiking to Sydney

A tired young albatross gets a second chance.

The crew was sailing Incat Hull No 84 on her maiden voyage from Hobart to Sydney to deliver the catamaran to Sydney Ferries.

Just north of Flinders Island, an albatross was seen on board "but he did not want to move". "It was a fair way north for a bird like that."

At Sydney, Taronga Zoo volunteers said they had never had an albatross in Sydney before. The bird was not injured, but was sick and dehydrated. The albatross was set free days later from a water police boat about 5km offshore from Sydney Harbour.

Trump Goes Green?

The Trump administration has officially told the United Nations the US intends to pull out of the Paris climate change agreement. But he does like to be unpredictable.

The US State Department described its communication with the UN as a "strong message" to the world, but the move was largely symbolic and it has no legal effect.

Mr Trump was still "open to re-engaging in the Paris agreement if the United States can identify terms that are more favourable to it, its business, its workers, its people and its taxpayers", the State Department said.

The earliest date the United States can completely withdraw from the agreement is November, 2020, the time of the next US presidential election.

The State Department said the US would continue to participate in international meetings and negotiations on current and future climate change deals. Under the agreement, countries set their own national plans for cutting climate emissions.

Recently Trump surprised his conservative base by supporting a deal for Mexican migrants. While I suspect he is no eco-warrior, he does like to surprise.