

MARINE *Life*

October November 2015 ISSUE 39



Our Goal

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

The Crew

Michael Jacques, Editor
NT Advisor – Grant Treloar
SA Advisor – Peter Day
WA Advisor – Mike Lee

Disclaimer: The views expressed in this publication are not necessarily the views of the editorial staff or associates of this publication. We make no promise that any of this will make sense.

Cover photo, Warty Prowfish, Victoria by Andrew Newton



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

Features and Creatures

North Solitary Upwelling	3
Scott Reef Research	4
National Marine Science Plan	5
Chinstrap Penguins	6
Paleogene Survivors	7
Basking Sharks	8
Handfish Fossils of Monte Bolca	9
Corals and their Zooanthellae	10
Great Southern Reef vs GBR	11
Royal Penguins	12
Qld Shark Netting/Blue Petrel	13
Portland's Three Capes	14
Iron Monsters	18
Norma wreck SA /Hougomont wreck SA	18
NT Fish Stocks	22
New Species found in the Tamar	23
Unclear cuttlefish research	24
Sydney Harbour fish stock concerns	25
SE Trawl fishery gets a Thumbs Up	26
Photos/Cots Robot	27
Sediments/parks	28
Bird ingest plastics	29

Upwellings from a grand canyon



Previously researchers thought fish only developed in coastal estuaries, but huge cauldrons of nutrient rich cold water, welling up from the deep, are full of baby fish.

The research team discovered massive under water canyons, including the North Solitary Island Canyon, the biggest on

the eastern seaboard. The canyons act as a conduit for the creation of the eddies.

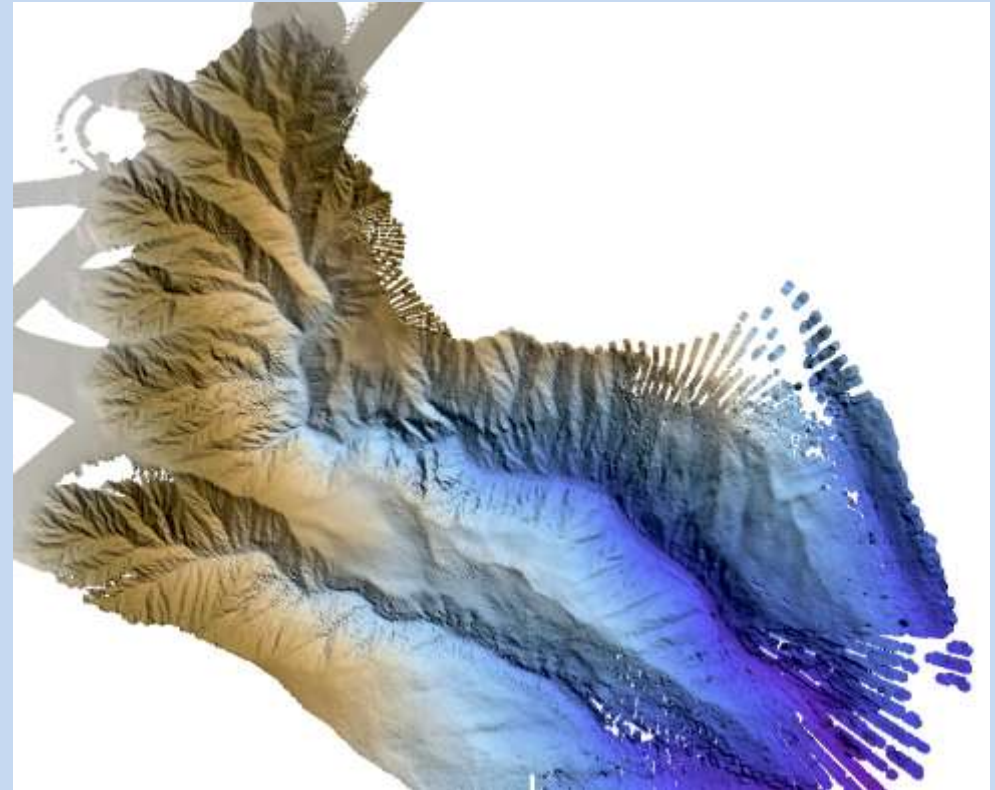
Professor Iain Suthers, from the Sydney Institute of Marine Science, said the research on marine eddies shows a whole new way of understanding the early life of fish. He said eddies are often hidden below a layer of warm water. Just 10 metres below the surface a huge cauldron of water is rotating at a metre per second.

The cold water has fertilizer nutrients, phytoplankton, and algae. "These things last for two to three weeks which is just the right window for larval fish to grow up, get its fins, get its eyes, and then swim back to the coast and settle into an estuary," he said. "It was keeping the community nurtured because of the uplift and the cooler temperature.

Researchers think only one in one million spawned fish survive, but those in the eddies might be doing better.

North Solitary Island Canyon formation, has been confirmed as the largest undersea canyon on the east coast of Australia. The image of the huge canyon shown below was collected by the *Investigator's*

CSIRO Multi-Beam Echo Sounder. The canyon runs south-eastwards from the edge of the continental shelf.



Apparently the local fishos knew off it just as a deep site called the Hole but didn't know the complexity of the entire structure. It is a heavily eroded prehistoric river valley.



Scott Reef Research

A month-long expedition is underway to Scott Reef and submerged shoals offshore of the Kimberley coast.

UW Photos N.Thake



Chief Scientist and UWA Oceans Institute Professor, Greg Ivey, said the researchers were excited about embarking on the cruise to support both physical and biological research.

This remote reef about 400 kms north of Broome is rarely visited. Scott Reef is divided into North Reef and South Reef by a large and deep lagoon. It is noted for its clear water and excellent pelagic fish life. It is considered similar to the world renowned Rowley Shoal and is apparently well-liked by sea snakes.

A significant proportion of South Scott Reef and the adjacent lagoon lies in waters between 30 m to 70 m deep and support a range of habitats similar to many of the submerged shoal systems strung along the edge of the continental shelf in the Timor Sea. The South Scott Reef lagoon covers 300 km² and is the largest area of this type observed on a single reef system in the NW region.

The scientists will explore the connections between ocean circulation, habitat patterns and benthic biodiversity on two deep-reef ecosystems in the region along with observing a coral spawning event during the cruise.

The seafloor and bottom coral communities will be mapped



using the *Falkor's* Remotely Operated Vehicle (ROV) sending real time high definition video to the *Falkor's* Science Control Room. In addition to the live video feed, the ROV carries multiple cameras recording both forward and downward views, with the location of every image precisely known.



The cruise coincides with a possible April coral spawning. However scientists know little about the reproduction of deeper water corals. If the deeper water species spawn, the scientists will be in an excellent position to film the event for the first time ever.



A Vision in Blue

Commentary by Mike Jacques

No, I'm not talking about the dress Scarlett Johanssen wore at the last Oscars. At a big launch in Canberra the Minister for Industry and Science announces a ten year plan for managing the oceans.



The resultant plan is a 48 page PDF that you can see at the marked link. It's quite glossy. The [National Marine Science Plan \(NMSP\)](#) has been created after much consultation and describes itself as a "consensus document". There is no lack of

thought about it, over 23 marine research organizations, universities and government departments and more than 500 scientists participated.

The Plan focuses on seven key challenges associated with our oceans. These challenges range from energy and food security; to national sovereignty and safety; understanding the roles of the oceans in climate change and developing effective adaptation strategies; protecting unique marine ecosystems and biodiversity; and ensuring that industry, government and the community have the tools to make good decisions about sustainable development.

The announcements were lathered with lots of statements about the importance of the ocean, "innovation cornerstones" even got a mention.

Apparently there is a thing called a "blue economy" and is projected to grow three times faster than Australia's Gross Domestic Product over the next decade. Australia's marine industries will contribute around AU\$100 billion each year to our economy.



As you may have guessed, I rather dislike imprecise waffly spin, so show me the substance. To me it seems to me to be a skilful way to get daft politicians to nod at the right time to more research funding, by coating it in honey and making it sounds like a great legacy project to enhance a dead-end political career. The main items seemed to be,

1. [don't go there]
2. Establish and support a National Marine Baselines and Long-term Monitoring Program.
3. National studies on marine ecosystem processes and resilience to enable understanding impacts [they even slipped in an explicit reference to climate change, I thought that didn't exist].
4. Create a National Oceanographic Modelling System
5. Develop a dedicated and coordinated science program to support decision-making by policymakers and marine industry.
6. Sustain and expand the Integrated Marine Observing System
7. Develop marine science research training that is more quantitative, cross-disciplinary and congruent with industry and government needs.[apparently too many marine biology and ecology graduates are on the dole, can't add up, or run a computer in a way that turns fish in to cash]
8. Fund national research vessels for full use ['stop the boats' was not supposed to mean the CSIRO research vessel].

Some of that is baseline research that we really need to fill knowledge gaps, and it doesn't hurt to remind people it's important. Then there were a few other futuristic thought bubbles that even included using offshore basins for CO2 storage [doesn't matter how often you say it coal is will never again be the new black].

So, did you get the cheque?

I'm probably unduly cynical about high level strategic plans and I invite you to read the Full Monty yourself, stripped of all my puerile comments.

Chinstrap Penguins

Sources; *Chinstraps nwf.org, lynxeds,yubanet, antarctic divn*



Chinstrap penguins breed mainly on the Antarctic Peninsula and on islands in the South Atlantic Ocean. There is a small breeding population on the Balleny Islands, south of New Zealand.

Chinstrap penguins are the second most abundant penguin species with approximately 11.8 million breeding pairs. The minimum breeding population was estimated at approximately 7.5 million pairs in 1993.

The eggs of chinstrap penguins are laid in late November. They generally have two chicks each

summer, both of whom are treated equally. This is unlike other penguins species where the stronger chick is fed first.

Chinstrap penguins are considered near-shore feeders, feeding close to their breeding colonies.

Although chinstrap penguins forage at sea throughout the day and night, diving effort is concentrated near midnight and noon.

Chinstrap penguins leave their colonies and move north of the pack ice in March through to early May for the winter.



Natures Real Survivors Pt VI –Rise of the Sea Mammals

The Paleogene Period 66 to 23.03 million years ago



This period consists of the Paleocene, Eocene, and Oligocene Epochs. The Paleogene is most notable as being the time in which mammals evolved from relatively small, simple forms into a large group of diverse animals.

The global climate during the Paleogene began a cooling and drying trend which, although having been periodically disrupted by warm periods such as the Paleocene–Eocene Thermal Maximum, persists today. The trend was partly caused by the formation of the

Antarctic Circumpolar Current, which significantly cooled oceanic water temperatures. The beginning of the Paleogene Period was very warm and moist compared to today's climate. Much of the earth was tropical or sub-tropical. Palm trees grew as far north as Greenland

The continents during the Paleogene continued to drift closer to their current positions. India was in the process of colliding with Asia, subsequently forming the Himalayas. The Atlantic Ocean continued to

widen by a few centimeters each year. Africa was moving north to meet with Europe and form the Mediterranean, while South America was moving closer to North America. Australia had also separated from Antarctica and was drifting towards Southeast Asia.

The plants of the Paleogene Period are very similar to the plants that we have on earth today. The warm climate at the beginning of the period was perfect for the dense forest plants. Mammals became the dominant animals. They filled ecological niches in the sea, on land and in the air. Even the first primates appeared. The Paleogene Period favored the birds. New species evolved. There were many large flightless birds that are now extinct.

Fossil remains indicate that whales and other cetaceans (the whales, dolphins, and porpoises) evolved from hoofed land mammals related to sheep, pigs, deer, camels, and cows. These animals returned to the sea about 50 million years ago, during the Eocene Epoch.

Going back to the oceans required many adaptations for living in the water, including a backwards and upwards shift of the nostrils, coverings for the nostrils, a streamlined shape, loss of the rear limbs, change of the forelimbs into flippers, addition of flukes for swimming, modification of senses for use in the water, loss of most hair, and addition of a layer of insulating blubber.

The Archaeoceti were the first primitive whales to appear. They had tiny heads and pointed snouts with teeth. Penguins, dolphins and dugongs also evolved. In the oceans, fish species branched out. Sharks became more plentiful.

The end of the Paleocene (55.5/54.8 Mya) was marked by one of the most significant periods of global change, the Paleocene–Eocene Thermal Maximum (PETM), which upset oceanic and atmospheric circulation and led to the extinction of numerous species. At the PETM CO₂ levels were five times today's concentrations and it was very wet at the tropics.

Basking Sharks

These fish are second-largest fish in the sea after whale shark.



This shark is a filter-feeder and cruises at the surface feeding on zooplankton. To do this it has specialisations, reduced teeth, enlarged gill slits, and bristle-like gill rakers. The Basking Shark (*Cetorhinus maximus*) is otherwise closely related to the large-toothed mackerel sharks of the family Lamnidae - which includes the Great White. However, these sharks are very gentle and social animals, even with humans and their boats.

The average basking shark will reach 6-8 meters long and weigh 7 tons. Basking sharks are slow swimmers and inhabit waters of the Atlantic, Pacific oceans, the southern tips of South America and Africa, Japan, Australia, and the west coast of the U.S. Basking sharks often travel in pairs and can congregate in large schools of 100 individuals.

The fossil record of Basking Sharks can be traced back only about 35 to 29 million years (compared with 65 to 60 million years for the earliest lamnid shark, *Isurolamna inflata*),



It has been suggested that there may be as many as four species of Basking Shark with the one from southern Australia (*C. maccoyi*), but the differences may only be due to different growth rates in each part of the world. There is insufficient evidence at present to separate these species.

Plankton is often thinly distributed over large expanses of ocean, varying in abundance both seasonally and regionally. So they travel long distances, but otherwise we know nothing about them. "Perhaps one or more geneticists will eventually obtain tissue samples from each of these purported *Cetorhinus* species and secure adequate funding to properly investigate the matter".

They are popular with divers and kayakers and there is quite a basking shark watching industry in the UK. It may even have sparked an ancient sea monster story or two.



Handfish, the Tethys Sea and Monte Bolca



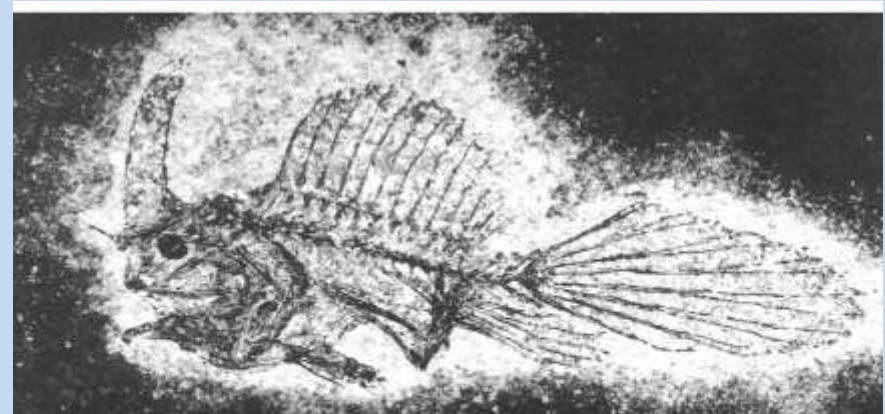
The handfishes are a small group of fishes, the living species of which are restricted to shallow temperate and subtropical waters of Tasmania and southern and eastern Australia. But it wasn't always so.

Despite their narrow present-day distribution, and their extreme rarity in the fossil record, handfishes are well represented in the Eocene of Monte Bolca, Italy. Monte Bolca was originally at the bottom of the Tethys Ocean before being uplifted from the ocean floor during the formation of the Alps. This happened in two stages, one 24 million years ago and one between 30 and 50 million years ago. The Tethys Sea no longer exists, but many of the fish that evolved in it spread around the globe.

The fish fossils found there are extremely diverse, consisting of more than 250 species, representing about 90 families. 85% are fish with developing spiny fins. The handfish obviously didn't know when to stop and evolved feet-like fins as well as all the usual ones you need for swimming.

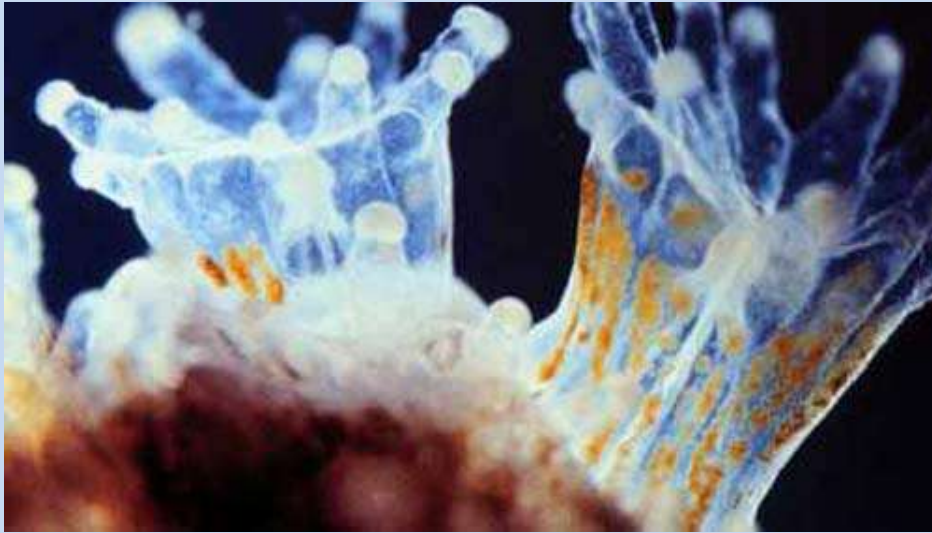
The fish found there suggest it was a sheltered tropical coral reef near a coast of seagrass beds, river outflows and lagoons with a seabed occasionally swamped by rich limestone mud that was low in oxygen and well preserved anything that died and fell to the sea floor. These fossils are so well-preserved that even the internal organs of some fish can be seen.

Now you are only ever likely to see handfish if you are a diver and look around on the mud in SE Tasmania. They are pretty easy to identify...they have HANDS.



Zooanthellae (and their more famous pals, Coral)

When we look at the Great Barrier Reef we see corals, but without their minute and anonymous algal friends, they couldn't have survived for so long.



The archaeocyathans were early corals from way back in the early Cambrian but they weren't big reef builders. Corals had their ups and downs before being replaced by scleractarian (modern) corals in the Middle Triassic. By the Late Triassic the Scleractarian had begun to construct reef systems in the nutrient poor zones. The Scleractarians were major reef builders for the rest of Mesozoic and Cenozoic.

Scleractinians calcify rapidly and their success on reefs was brought about by a symbiotic (helpful) relationship that developed with a one-celled algae called zooxanthellae. These algae cells live in the tissues of their coral host and start using the sunlight to produce food. They are protected by the coral and feed their host in return. As much as 90 percent of the organic material the algae produce is transferred to their host animal. The food is so rich the coral barely needs to feed for itself. This is thought responsible for promoting rapid calcification (skeleton growing). They quickly out-performed all the bryozoans and other invertebrates that had previously been the main reef forming animals.



Zooxanthellae are microscopic single-celled yellow-brown algae (*Symbiodinium* spp.) that live within the tissues of many marine invertebrate animals, such as flatworms, giant clams, jellyfish, nudibranches, sea anemones, and sponges. Extremely small, about 10,000 of these algae cells

would fit in the area of the period at the end of this sentence.

These algae and the pigments they contain are what give many marine invertebrate animals their beautiful colors. When corals become stressed (such as due to excessive heat), a mass expulsion of zooxanthellae leaves corals appearing white. This process is known as "bleaching" and bleached corals typically struggle to survive without their zooxanthellae. Coral bleaching can be fatal since the corals main energy source is now gone, and the coral begins to starve. Additionally, bleached corals have a much greater susceptibility to disease. So when we talk about corals dying as the climate warms, we are really talking about the zooxanthellae that support them.



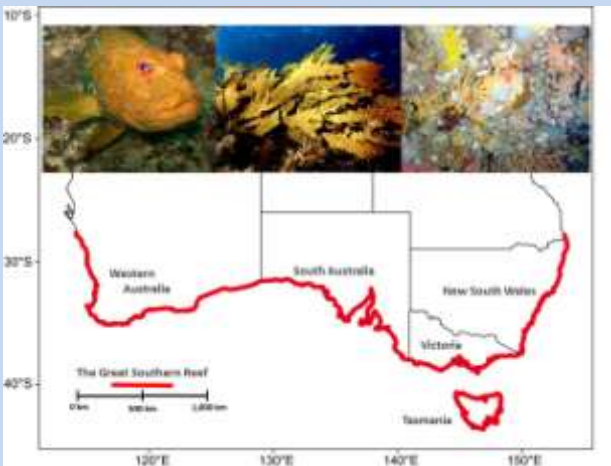
New Massive Reef Discovered – How did you miss it?

Commentary by Mike Jacques

"The Great Southern Reef covers 71,000 square km. Its kelp forests contain unique and diverse marine life by global standards, and it contributes more than A\$10 billion to Australia's economy each year".

Peter sent me a link to a "Conversation" article which had scientists trying to quantify the economic value of our southern temperate coastline. In the process they must have discovered a new reef thousands of kilometres long...the Great Southern Reef. Apparently it has been there all the time and we just didn't see it. "Although most Australians live and play around the reef, they have little awareness of its value and significance, and too few resources are allocated to understanding it."

I have two comments, one is my usual one that I find valuing natural systems a bit like getting a valuation done on your daughter. Do we really need that evidence to treasure and nurture something? Maybe we do?



The other comment was what "Great Southern Reef"??? I thought our southern temperate coastline was sand banks, mangroves, beach and about a dozen other types of habitat, not just reef? I think I get it though, to value something it has to make the sound of cash registers AND it has to have a fancy name.

"Australia's southern coastline, from Brisbane to Perth, is fringed by rocky reefs dominated by [well contains I'd say] "kelp forests" – highly productive, structurally complex communities of large brown seaweeds."

Now for some gee whizz statistics,

- Kelp forests are produce as as much as 65 tonnes of biomass per hectare per year, more than 16 times the yield from Australia's most fertile wheat fields."
- Up to 80% of the biomass produced by kelp forests are exported to surrounding habitats where it provides an important food source
- It is a hotspot for life, as many as 30-80% of species in these taxa are found nowhere else on Earth."
- The reefs "form an entity" of thousands of kilometres of rocky reefs dominated by kelp forests, inter-connected through oceanographic, ecological and evolutionary processes – "truly a Great Southern Reef" [no, not truly].
- Just the rock lobster and abalone fisheries are worth approximately A\$375 million and A\$135 million per year - four times the value of all commercial fishing on the Great Barrier Reef.
- Total tourism expenditure is around A\$40 billion per year.
- In regional areas, the reef contributes around 15% to the total economic activity.
- Roughly 5.3 million Australians regularly participate in recreational fishing on the reef, estimated to be worth around A\$500 million per year.
- Kelp forests represent significant carbon pools that could play an important role in greenhouse gas mitigation and nutrient cycling. "These ecosystem services are likely to be of the order of several hundred billion dollars per year".
- There may be new ways that we exploit the reef that we need to regulate, such as "bioprospecting" for seaweeds and sponges.
- 81 – 99% of all reef-related news stories reported in Tasmanian, Victorian and South Australian newspapers focused on coral or coral reefs.

“The Australian Research Council has awarded more than A\$55 million to coral reef research compared to only A\$4 million awarded to temperate reef research”.

-



So now we get down to it. The “Great Southern Reef” has been losing out in the political attention stakes, meaning that the shrinking pool of funding has been hurting more in the under-recognised south. They don’t have the iconic picture postcard corals. I’m not sure I would argue that a redistribution is needed. That is just a reduction in coral research. A better argument is that temperate reef isn’t really funded at all, and needs more attention and the research funding pool needs to grow.

The threats that have been listed are real enough,

- Waters of the western and south eastern reef are currently warming between 2 and 4 times faster than the global average.
- Warming has caused substantial changes in species distributions on the reef. Sea urchins and tropical fishes are decimating kelp forests in the western, eastern and south eastern reef.
- There have been abnormal heat waves in the west.

- population growth, currently 16 million people live adjacent to the southern reef but that is set to double by 2060.

“Ensuring that Australia’s temperate reefs continue to support and deliver valuable services into the future will require a strong knowledge-base and the public and political will to look after the system. It will need a commitment that reflects the immense ecological, social and economic benefits we derive from the Great Southern Reef.”

Fair enough, but I still can’t get over this post climate change adaptiveness that appears to have extended its range into nomenclature. Why the GSR? Why not something more original?

Other Possible Names for the “GSR”

- “The really really long and diverse coastline of southern temperate Australia” . Nah, too accurate.

- How about “Joh Bjelke Petersen Land” in honour of someone who saved it from high rise tower blocks by making all the shonky carpetbagging developers go to the Gold Coast instead.

- How about an even bigger name “Clive Palmer Land” with the slogan “valued at more than Clive's bank balance and better than an endless pack of Tim Tams, and so huge that if its coastline was a belt would have a circumference that would go half way around Clive's ego”, am I close?

If you have any suggestions, I’d love to hear them.

No break in Qld shark netting

The Qld shark control program last year netted 667 sharks and 131 other marine animals.

Fisheries Minister Bill Byrne said he has absolutely no intention of changing the current policy on netting or drum lines in Queensland."



The conservation group Sea Shepherd has been asking for its removal, and recently publicised video of a juvenile dolphin hooked on a drumline off the Gold Coast. It also other animals drowned in nets.

Government statistics show almost 20,000 sharks of all sizes have been killed by the program since 1985.

Only one person has been attacked by a shark on a protected Queensland beach since the program started.

A former manager of the control program, Baden Lane, said "You've got to balance the environmental impact of the program against human safety and I don't think there's an argument."

Bond University Associate Professor Daryl McPhee said a range of different approaches were available. "The shark control program is a very old approach to the challenge of bather safety," he said. Mr McPhee said bather protection enclosures and shark spotters had been trialled in South Africa and electrical and chemical deterrents had been trialled in the US. "We can also think about the way nets and drumlines are deployed " The New South Wales Government removes shark nets during the humpback migration in winter and does not use drumlines. The Queensland Government does use pingers, turtle exclusion devices and different drumline baits to reduce by-catch.

Professor McPhee concluded, "At a surf beach you're 60 times more likely to drown than you are to be killed by a shark."

Blue Petrel

Source: Brook Whyllie SOSSA



Participants in the Southern Oceans Seabird Study Association (SOSSA) pelagic trips from Wollongong have been fortunate enough to observe a Blue Petrel. Blue Petrels are rare in NSW waters. This is only the second time a Blue Petrel has been sighted on trips. Blue Petrels are a small prion-like bird, although larger than most prions. Blue Petrels primarily occur south of the Antarctic Convergence, nesting on a number of Sub-Antarctic islands, the closest being Macquarie Island. They are not globally threatened.

VIC Feature

Portland and its Three Capes

Portland is one of the only cities in Australia where koalas, seals and whales are all regular visitors to the CBD, and it's a highly industrial city at that



Portland is a place where the sea still dominates daily life. The bay is the only deep sea port between Adelaide and Melbourne. It offers a sheltered anchorage against the often wild weather, as much for the sailing ships of old as it does for the queue of huge ships that still dock there every day collecting wheat, woodchips and aluminium ingots.

The surrounding Victorian coast is usually surface limestone, but Portland is predominantly basalt from recent eruptions, some only 6000 years old. The main practical difference is that the area has big stark

volcanic cliffs and three large jutting capes, a geological gift that shelters the Portland area from damaging westerly winds.

The bay was named in 1800 by the British navigator James Grant who spotted the headlands from the *Lady Nelson* while sailing along the Victorian coast.

Gunditjmara people lived in the area and were renowned for living in relatively sophisticated permanent stone huts and for their elaborate aquaculture practices. Early whalers made use of the shelter of the bay on periodic whaling forays and "brought disease and violence" to the local Aboriginal inhabitants. However, it was the settlers who had the most impact on the Gunditjmara people. Portland has a temperate climate with cold, wet winters and warm dry summers, ideal for sheep farming.



In 1834, the Henty family settled there from Tasmania and they were the first white people to turn a sod in Victoria. Henty immediately began planting crops, grazing sheep and coordinating the local whaling trade,

all without permission from the government. He arrived a year before fellow Tasmanian settlers established Melbourne.

There are some dark stories of massacres as a clash over land ensued. By 1841, the local Aboriginal clan had been reduced to one old man and a youth. They joined forces with the Gard gundidj clan at Mt Clay. The Mt Clay people prohibited any Aboriginal person from going into Portland, a 'taboo' that was still being followed by some as late as 1941.

In 2007, the Gunditjmara People were recognized by the Federal Court to be the native title-holders of Crown land and waters in the Portland region.



Cape Grant is now dominated by a smelter, but ironically a gannet colony thrives nearby

Due to its coastal location and east facing harbour, Portland had become the focus of European activity in Western Victoria, but frequent storms demonstrated the need for a more enclosed harbour. Several proposals were made but there were decades of delays until the present huge breakwater and wharves were constructed.

Through the 19th century Portland developed to become an important fishing port and a centre for wheat and wool exports. Eventually the wool industry came to be dominated by Geelong and Portland fell behind Warrnambool as the region's main commercial centre.



Love it or hate it, all vistas in Portland come with complimentary wind turbines, combining the ancient with the modern

In the late 20th century Portland's role as a major hub began to revive, boosted by the tourism industry and a new industrial smelter. Portland has Australia's third largest aluminium smelter, with a capacity of around 352,000 tonnes of aluminium per annum.

The other huge piece of industrial plant is the wind farm which opened in 2005 and runs along the coast of Portland's three capes. At the time it was one of the biggest wind farm developments in the Southern Hemisphere. It produces 195MW enough electricity for about 125,000 homes. While it's helping reduce our carbon footprint, it is a great illustration of how everything we do comes at a cost and is a balancing act. There was strong opposition from residents to the visual impact of towers and the power lines.

The Port of Portland has even been proposed to take over some of the overflow from Melbourne. However, while it is a large industrial complex, efforts have been made to keep it accessible to tourists and locals. There are good picnic areas, a marine discovery centre, a light rail along the foreshore running a vintage tram, and lots of surviving heritage buildings.

While no longer as important as an industry, Portland is still home to a fishing fleet of 60 vessels. During the austral summer, the Bonney Upwelling brings nutrient-rich deep ocean water to the surface in the Portland area, supporting rich marine life. Seals and large Eagle rays frequent the city boat ramp and fish cleaning tables. Southern Right whales and Humpbacks enter the bay annually and support a big influx of sightseeing tourists.



For the fit and hardy the Great South West Walk provides a challenge for bushwalkers. The Portland capes are one of the highlights of this a 250-kilometre (160 mi) walking track. Designed as a long distance walking track, it is also ideal for short walks and day walks. The walk travels through forests, river gorges, cliff tops and sheltered bays. Short walks to the bays around Cape Nelson are great. They even



have a good restaurant at the lighthouse to add a bit of glamour to your sweaty bushwalk.

For me, the trip to nearby Cape Bridgewater was the highlight, a short 20 minute drive from Portland. The Cape is actually the western rim of an extinct volcano, much of which has now subsided into the bay leaving behind impressive cliffs and a series of unique features.



To attract tourists the locals have built a walking trail along these rolling sea cliffs. To access the walking track is just past the kiosk and Surf Club at Bridgewater Bay. It's strenuous without being tough and well worth the 2-3 hours out of a busy travel itinerary, especially on a good day. The track leads to a viewing platform at the Seal Colony at Cape Bridgewater, so bring a zoom lens or binoculars as the platform is well away from the seals. The colony consists of up to 650 Australian Fur Seals lolling about on the rocks. In fact, I found the seals less interesting than the coastal scenery in general, and there are lots of hawks, seabirds and other things to see along the way. If you don't want to go the full distance, walk 15 minutes to the old boathouse. You can then rent a spot on a boat tour out to the seal colony. When you get back, try snorkelling out to Horseshoe Reef, only a stones throw from the boatsheds.



To cap it off Cape Bridgewater also has plenty of other geological features, the most popular being the Petrified Forest.

There are many theories about how the Petrified Forest was formed. It is not made of petrified wood, but is a series of solution tubes. Once it was a forest of probably Moonah tea tree scrub (*Melaleuca lanceolata*), which was eventually smothered by a large sand dune. Water seeping down through the sand formed a crust of sandstone on the outside of the tree trunks.

Over the years they have suffered considerably damage at the hands of souvenir collectors and walkways have been built to protect the site from erosion. It is also hard to take a picture that doesn't include, you guessed it, wind turbines.

If that doesn't float your boat, nearby there are also some blowholes, not working too hard on the glorious day when we were there. The crazed patterns left behind in the basalt as it cooled still capture some of the geological drama of a coast that was recently belching lava into the ocean from a number of inland volcanoes. If you want to see one of the spots where it started, check out amazing Tower Hill Reserve near Warrnambool. There are great short walks there too.

So how does a marine enthusiast get the best out of South West Victoria? I'd say don't go there with a one-eyed approach, or for a day, only to fish, or dive, or canoe, or bushwalk, or beachcomb, or birdwatch, or read a book. Go there and try the whole lot on different days.

You can go there and realistically expect a once in a lifetime encounter with Blue Whales and endangered Albatross on an offshore cruise (hard enough to organise), but you could also be there for a week just watching the waves bounce the charter boat against the jetty. This coast has lots of everything, but often it is tantalisingly difficult to grasp. But the extreme weather, crashing waves and nutrient-stained waters are part of what makes this coast unique and gives it life.

Spend some time, have a plan for something special, but also have another plan to try other ideas outside your usual comfort zone.



Shipping Heritage

The Peak of Sail – The iron monsters

After the 1860s, steam engines began to displace sail. Even by 1890, the amount of British shipping using sail had shrunk to 40% of all tonnage. Shipowners with a romantic desire to continue in sail could still do so in some niche long-haul trades, where the high coal price made their low freight rates competitive. To get a reasonable return on investment they had to build ships that cost the least in labour and maintenance outlays for the biggest cargo tonnage possible.

By the end of the nineteenth century, iron and steel sailing ships reached their technical peak. Ships of under 2000 tons became 300 feet long, five-masted monsters of 5000 tons. Instead of muscle, steam boilers powered winches to handle cargo. Rigging was refined until the ship could be run with very few men. The last of the big hi-tech sailing ships were launched by the Germans, who could take advantage of a less-regulated environment to pump out cheap standardised ships.

Windjammer was coined for these large monsters that were too gross and clumsy to sail neatly into the wind, "these white-winged tall ships were unparalleled in size, power and beauty. Many were twice as long as the graceful wooden clipper ships that had preceded them, and almost as swift. With acres of sail on their towering masts, they carried thousands of tons of nitrates, guano, coal, grain and timber around the world in their vast hulls".

While Australian ports saw the large 5000 ton vessels, none were wrecked here, leaving only a few photos as relics of their passing. Several hi-tech larger sized four masted barques of around 2000 tons were lost on the Australian coast.

The Norma -SA



The 2122 ton four-masted steel barque, Norma, was designed to carry large cargoes. On its maiden voyage, under Captain D. McDonnell, the Norma carried 8,500 tons of coal from Glasgow to Rio de Janeiro. Unfortunately a revolution broke out while the barque was unloading its cargo and, in a very nasty experience, the hull was marked all over by bullet splashes. To escape the flying bullets, the crew had to constantly take refuge under the hatches. There were no casualties amongst the ship's company but, unfortunately, a ballast lighterman was killed by a rifle bullet. On one occasion, a shell burst overhead with a piece weighing about kilogram falling on the Norma's deck.

In another incident, in 1903, the Norma arrived at Newcastle (NSW) in a gale and attempted to sail into the port without the assistance of a tug. The barque came too close to the reef at the north end of the entrance and had to put down two anchors to avoid running onto the rocks. Luckily the anchors held, but by then the vessel was washing over the reef. The Newcastle lifeboat went out, but the Captain, William McLaughlin, refused to abandon his ship and signalled for a tug.



Several tugs went out and, although hawser after hawser was made fast to the *Norma*, the towing lines broke and, with the lifeboat alongside, the barque lay in the broken water of the reef all through the night. The next day the powerful tug *Champion* arrived from Sydney and was eventually able to drag the *Norma* out of the surf and to a berth in the port. As the two vessels passed by, other shipping in the port cheered.

The *Arden Craig*, an iron ship of 2153 tons, inward bound from London came to the anchorage, shortened sails and prepared to drop anchor. The captain saw the light on the *Norma*, thought it was the pilot coming, and only realised it was another ship at anchor when it was too late. The *Arden Craig* rammed the *Norma* on the port side well below the waterline. The crew abandoned ship, one man was lost and the *Norma* heeled over and sank.

This was the official version of the accident given to the Marine Enquiry. Another version given by a seaman from the *Arden Craig* was a little different: as the ship was coming to the anchorage the mallet used to knock the pin out of the anchor chain could not be found and as she closed in on the *Norma* the captain was on the deck yelling 'let go that ●●●●● anchor'.

To add insult to injury, a little later in the morning, the coastal steamer, *Jessie Darling*, of 289 tons, bound for Port Adelaide with 2250 bags of

wheat, was passing the anchorage when she saw a spar in the water near where the *Arden Craig* was anchored and headed towards it only to come to a sudden halt. She had run into the submerged *Norma*, the crew abandoned ship and within five minutes the *Jessie Darling* had settled on top of the *Norma* with only her masts showing. The "Jessie Darling" was later refloated. The "Norma" was obviously too close to the shipping channel and was dynamited.

Today the *Norma's* remains form an artificial reef on a sandy bottom in about 15m of water. As a consequence of the blasting, much of the hull is a widely dispersed, broken up mass of iron plates and other fittings. Much of the wreck is covered with sand but fire bricks can be seen lying on top of the wooden hull which sits in a depression in the reef. Numerous artefacts include ships' fittings, clay pipes, glass bottles and dishes, copper sheathing and ceramic jars. The bow area is still recognisable and is visited by magpie perch, wobbegong, tommy ruffs, whiting, bullseyes, old wife, boarfish, snapper, yellowtail, morwong and goatfish. The area can be affected by poor visibility sometimes and is subject to strong tidal currents and is for advanced divers.





The bell was brought to the surface in 1928, caught on the anchor of a local fishing boat. Some time later the (headless) figurehead of the Welsh druidess Norma (after whom the vessel was named) was found floating in the mangroves near Port Gawler. They are now in the custody of the South Australian Maritime Museum.



Hougomont



The four-masted barque Hougomont was built in 1897 by Scott Shipbuilding and Engineering Company of Greenock, Scotland for J. Hardie and Co. of Glasgow. The steel-hulled vessel of 2378 gross tons measured 292.4 feet (89.1m) in length.

Like all Hardie's four-mastered barques, she was named after noted British victories in the Napoleonic Wars. Others were Vimeira, Corunna, Talavera, Nivelle, and Salamanca. Hardies diverted from this rule four their last four-master, the Archibald Russell which was a full sister to the Hougomont and Nivelle, although the Russell was fitted with bilge keels and the others were not.

Throughout her long career, the Hougomont seemed to be always in trouble. These episodes were strangely spaced at five to six year intervals. The first occurred in 1903 when she drove ashore in Allonby Bay, Cumberland, where she was partially dismantled.



Next, she was posted missing on a ballast voyage from Coquimbo toward Tocopilla, both on the West Coast of South America. Carried past Tocopilla by the Humbolt Current, and

with no wind to get back, she eventually turned away and headed towards Sydney where she duly arrived.

She steered clear out of trouble until 1915, when she drove ashore on Fire Island, outside of New York. She was refloated little the worse for wear. In 1921, she was laid up in St. Nazaire, where she stayed for three years. In 1924 she was purchased by Captain Gustav Erikson, of Mariehamn, Aaland Islands, Finland.

When the Hougomont raced the Archibald Russell from Australia to Ireland in 1927, her crew went so far as to scour her bottom while underway by dragging a wire under it — and won by four days. On the Viking in 1934 a man remarked that the barometer was up, presaging good weather. "To hell with a high glass!" snapped the captain. "We want it pointing to storm and getting us home."

When outward bound towards Melbourne with timber in 1928, she was again dismasted off the Portuguese coast; she was refitted in Lisbon.

At 1.00 am on 21 April 1932 the *Hougomont* was west-south-west of Kangaroo Island in ballast and bound for Port Lincoln to load a cargo of wheat, when a fierce gale struck. Within minutes the steel foremast and mainmast had snapped and crashed to the deck. Miraculously no crew member was injured, but the *Hougomont* was seriously damaged and wallowing in heavy seas. Anxious hours were spent cutting clear the pounding wreckage and the vessel proceeded under jury rig to the Semaphore anchorage – a slow 18-day journey during which the captain resisted all offers of assistance, to avoid possible salvage fees.

Despite this amazing feat, the owners felt that necessary repairs were too expensive and decided that the *Hougomont* should be scuttled. After stripping the vessel of its fittings, the barque was towed to Stenhouse Bay, Yorke Peninsula, on 8 January 1933. It was positioned south-west of the jetty and sunk with explosives to provide a breakwater for vessels loading gypsum.

A charge was set off in the forehold, and the ship slowly sank, until only the decks and rails were above the water. Captain Lindholm, who was the last of the crew to leave her, said, "Sinking her is the saddest job of my life."

Today the full length of the hull of the *Hougomont* still lies on the seabed in 9 metres of water. The bow and stern sections stand upright, although the majority of the vessel has collapsed.



NT Fish Stocks concern



Despite the small population of the NT everyone is fishing mad, and that puts a lot of pressure on the more accessible areas. The Minister has become concerned, and in June imposed some temporary reef protection areas.

"I've been particularly concerned about the number of fish out on the reef, particularly golden snapper and jewfish," Fisheries Minister Willem Westra van Holthe said. "They've dropped right off in recent years." This has become particularly apparent in the western zone of the fishery from Coburg Peninsula in the east to the West Australian border.

The departmental website also said "Recovery of depleted stocks around the Darwin area in particular can only be achieved through a package of measures consisting of reduced possession limits, vessel limits and the implementation of specific protected areas for a period of time." Areas that only protect depleted populations of fish will mean that recovery is slow (if at all) and increasing fishing pressure on open areas of the fishery may negate any positive impact from the protected area."

The reef protection areas are set up until 2019."In five years' time [we can] have a look at whether we can lift those protection zones"

The Territory Government is ramping up its monitoring of reef fish stocks. The \$200,000 five-year plan will see increased radar and camera surveys of the reef protection areas near Darwin and the Tiwi Islands. NT Fisheries will survey the reefs closest to Darwin each month because species there are the most threatened.

Reef species such as jewfish and golden snapper have long lives, which means it takes years for juveniles to mature and stocks to replenish.

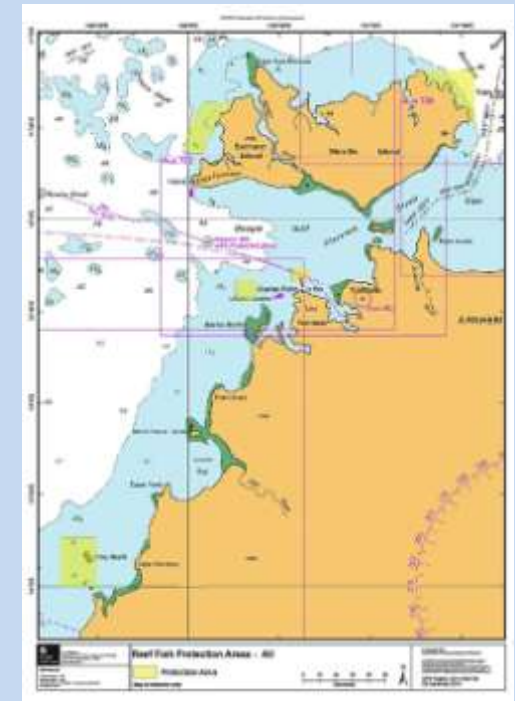


But the Amateur Fishermen's Association of the NT (AFANT) cried foul when it was later revealed that professional anglers could target surface species in the protection areas.

NT Fisheries said surveys showed commercial operators targeting surface species have little impact on threatened reef numbers, which live near the sea bottom. In the western zone commercial operators took five tonnes of golden snapper. Over the same period recreational fishers took 90 tonnes and charter boats a further 15 tonnes of the same fish.

The Government has been forced to take action. While there are 54 commercial operators holding coastal line licences, only eight have been granted quotas to operate in the zone. Many may be forced out of the industry.

All this sounds eminently sensible. I only have one question. If everyone lives near Darwin and is depleting the harbour reefs, why are the protection areas so damn far away?



Six new coral species discovered in Tasmania's Tamar River

Photos: David Maynard

University honours student, Megan Dykman, of the Institute for Marine and Antarctic Studies has discovered six new species of soft coral in the Tamar River in northern Tasmania.



Megan set out to study the river's ecosystem, "We just wanted to study this group to get some baseline knowledge as to what was there," she said. Six of the coral specimens they examined had not been recorded.

"From the 46 specimens we

collected, there's six groups that look to be new species - they don't match with previously described species," Ms Dykman said. "Particularly two of those species look like they belong to a whole new group of sub-corals.

The Queen Victoria Museum and Gallery's (QVMAG) natural sciences curator David Maynard said the finding was significant. "Any time we find a new species that helps us better understand our environment, it's important," he said.

"We don't really understand the Tamar estuary and the animals that are [there], and if we are to manage it properly we really need to understand what makes it tick."



Mr Maynard said the findings would pave the way for further research in the area.

"Now that we've found these species it gives us the opportunity to go out there and look for further new animals living in the Tamar," he said.

The new coral species will be on display at Launceston's QVMAG next week as part of National Science Week.



Report Unclear about SA Giant Cuttlefish Decline

The giant Australian cuttlefish (*Sepia apama*) is IUCN-listed as Near Threatened because the largest known breeding aggregation of this species in northern Spencer Gulf, South Australia, has declined. A recent CSIRO report suggests the decline in cuttlefish numbers in the upper Spencer Gulf was not about fishing or warm waters, but the full reasons still aren't understood.



During the 1990s, every winter hundreds of thousands of giant cuttlefish assembled to breed on the shallow, rocky reef near Port Bonython in the northern Spencer Gulf. The area has good rocky substrate which is rare further north (the remainder of the coastline is

dominated by mangroves, tidal flats and saltmarshes). *Sepia apama* breeds at either 1 or 2 years of age. Females deposit their eggs on hard reef. Embryonic development takes 2–4 months, with juvenile cuttlefish hatching in late winter and early spring.

S. apama populations are probably influenced by natural environmental and human effects, including climate change. Laboratory experiments have demonstrated that temperature, salinity and food availability affect egg and juvenile development. Commercial and recreational harvesting and accidental by-catch owing to prawn trawling also trim numbers.

Between 1993 and 1998, a small hand-jig fishery targeted the breeding aggregation. Declines in cuttlefish abundance on the aggregation site led to fishing closures in 1998. The size of the breeding aggregation continued to decline, with a record low of 13 452 individuals in 2013. *Sepia apama* abundance also declined across northern Spencer Gulf more broadly. The northern Spencer Gulf cuttlefish fishery was closed

completely in April 2013. Giant cuttlefish abundance at the aggregation site has recently increased to 57 317 individuals.

This would seem to indicate the importance of fishing, but that didn't prove to be entirely accurate. Fishing catches fell as numbers fell but did not cause the reductions in a way that would account for the size of the change. The catch is also quite small. Sea surface temperature also didn't seem to correlate with the changes.

Declining winter abundance on the Port Bonython breeding grounds is not due to the failure of the species to aggregate, but is part of a general decline in the size of the northern Spencer Gulf population. The population is distinct from *S. apama* inhabiting southern Spencer Gulf but the research did indicate that the known *S. apama* breeding grounds might be supplemented by breeding grounds elsewhere in the northern Spencer Gulf.

It has even been suggested that the big aggregations of the 1990s were simply a boom time for numbers, and we are now returning to natural levels. One winter survey in June 1982 failed to record any *S. apama* on subtidal reef adjacent to Port Bonython.

The only good thing about declining cuttlefish numbers is that it has made them the focus of recent research.

Invertebrates definitely get study attention deficit. Of the 195 species recorded on the IUCN Red List, 76% are listed as *Data Deficient*.



Sydney Harbour no-fishing zones needed

There are twice as many recreational fishers in Sydney than in any other estuary in New South Wales. Divers recently found that sanctuary areas with no fishing had seven times the abundance of large fish and three times the diversity.

Photos John Turnbull



The Underwater Research Group carried out 45 surveys at 25 sites as part of the Sydney Reef Life Survey. Coordinator John Turnbull said the survey was showing the changing face of Sydney Harbour. "There is evidence of global warming starting to appear, we're getting tropical fish from the Barrier Reef who can survive this far south now," Mr Turnbull said.

The Sydney Institute of Marine Science has funded volunteers in the marine-biodiversity survey which started in 2008. Professor Emma Johnston from the University of New South Wales said the surveys indicated a huge impact on fish communities. Scientists wanted more

fully-protected marine sanctuaries with no fishing. Professor Emma Johnston added: "Sydney Harbour has a habit of looking absolutely beautiful. But if you go just below the surface, you can find problems. And in a region which is host to so many people, we need to manage activities really carefully."

Fishing journalist Al McGlashan, said "There's heaps of big fish in the harbour ... Today we drove down — there's whales out the front, there's dolphins through here [*not suppose to eat them mate*]. There's a huge school of salmon there. We've caught Kingfish up to 90 centimetres. McGlashan said numbers of large fish had been increasing since commercial fishing was banned in Sydney Harbour in 2006.



"In my experience, fishermen are the biggest conservationists in the world [*I'm not sure girth has anything to do with it*] because we want more fish." "Management, but not lock-out — that's the one thing I'm against," he said. "There's definitely a place for marine reserves. But the ones that we've had

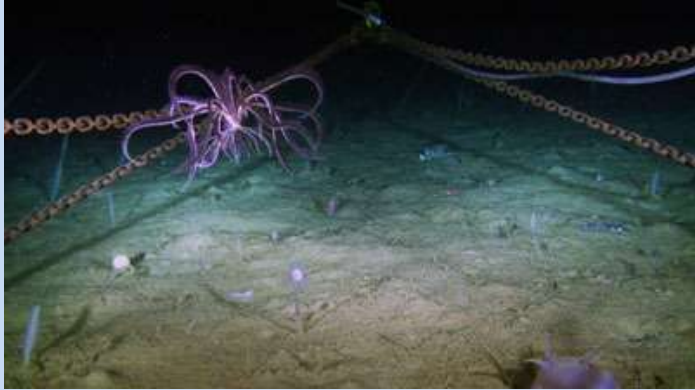
in NSW have been a complete failure.

So how about we let the statistics do the talking. John Turnbull notes that , "Based on 14 surveys covering 7000 square metres in and around Sydney, we recorded an average of 16 species of fish per survey. Of the 16 species, on average only 1 was a target species; the other 15 species included mado, hulafish, cardinal fish etc which are of no interest to fishers. Most of the target species were too small to keep in any case; only 3 out of the 14 surveys recorded any target fish of legal size. And these 3 surveys were all in the Cabbage Tree Bay sanctuary zone. In other words, in a year of surveys **we have never recorded a target species of legal size in a fished area of Sydney**".

Of course there are still sized fish left. They must be somewhere, but it clearly isn't a 'business as usual / she'll be right mate, kind of picture.

CSIRO study shows trawlers in south eastern fishery affecting 6 per cent of sea floor

A CSIRO study of Australia's South East Trawl fishery has found the trawling is affecting 6 per cent of the sea floor.



The South East Trawl Fishery stretches from Sydney, around Tasmania and up to South Australia. The South East Trawl fishery uses bottom trawling to fish for species such as blue grenadier, pink ling and tiger

flathead. Thirty trawlers work the area, catching between 10,000 to 12,000 tonnes of fish a year. Roland Pitcher from the CSIRO says their study shows the trawlers are interacting with 6 per cent of the sea floor.

Simon Boag is the executive officer of the South East Trawl Fishing Industry Association says there are very few vessels. It's quite a small fishery and 44 per cent of the fishery is closed to trawlers in marine parks in south-east Australia.

The CSIRO study found that since 1985 trawling has seen a decrease in marine life on the ocean floor, such as sponges, corals and invertebrates. But invertebrates have recovered by up to 3 per cent as fisheries have closed and marine parks have opened. "bottom-dwelling invertebrates are actually still rising in abundance, so things are getting better, not worse and things never got that bad, even after 100 years. So I think the impact has been fairly minimal, really, especially when we compare it to the other alternative, which is to clear more forest and drain more wetland and grow more food on land."

It would be interesting to see how the percentages were calculated and whether that was 6% of productive areas, or included quite a bit of lifeless abyssal plain. It might also be interesting to see what we meant by "affect". The report does note that it's difficult to be precise about

that exact effect in areas that are trawled because what we don't know detail of how many animals may have been living in the direct path of all the trawls that were towed through the region.

Environment groups that have been critical of the fishery in the past aren't commenting on the CSIRO paper as they have only seen a summary.



The findings would appear to fly in the face of other studies such as by NIWA in New Zealand. They surveyed small seamounts on the northern Chatham Rise, known as the Northwest Hills. This region has been heavily fished over the previous 10 years. In 2001 they completed a survey and found a strong contrast in the extent of coral cover between fished

and unfished seamounts, distinct differences in the composition of species communities, and physical evidence of previous trawls in the form of gouges and scours on the seabed. The study indicated that the corals were at least 50 years old, and have a relatively slow growth rate of 2–3 cm per year, which could mean large corals are several hundred years old. Their resilience to fishing may be low.

I think CSIRO research scientist Roland Pitcher is closer to the money when he says trawling does affect the ocean floor, but "It's a question of a value judgment about the acceptable level of change and the point is here that at the scale of the whole of the south-east, depending on the different kinds of fauna, that more than 80 to more than 90 per cent of these types of fauna remain in the south-east region."

I also find it interesting that the once strongly opposed MPA systems are helping the commercial fishery to trade on a clean green marketing image.

No bad days on the water

Recently I went on a dive in the Derwent River after rain and I have to say that the temperature and visibility were about as bad as it gets.



Fortunately the company was good and Nick Perkins managed to frame a pretty good finger sponge shot to make the day worthwhile.

The eerie lighting it tells a story about challenges for marine life (and divers) created by the turbid waters of an estuary habitat in flood.

It seems like there might be a hidden gem out there for you too somewhere near your home, and the days are getting longer and sunnier. Get off that couch readers and dust off that kayak, boat or beach gear.

The COTS 'Terminator', hunter-killer Robot

Queensland researchers are close to completing work on an autonomous robot that will cruise the Great Barrier Reef and inject the destructive crown-of-thorns starfish with a toxic chemical.



Research by the Australian Institute of Marine Science, has observed that over the past 30 years, there has been a severe decline (almost 50 percent) of the coral cover on some surveyed

reefs. Besides climatic changes, pollution and over fishing, one of the major causes is the Crown-of-thorns starfish or COTS. During a 'population explosion' of sea stars there can be almost 100,000 COTS per square kilometer.

Human divers can inject only 120 sea stars per hour, which means that it is impossible to cover large areas. The COTSBot is a yellow torpedo that weighs 30 kilogram and has a speed of over 2 meters per second.

The COTSBot underwater robot uses GPS technology and powerful thrusters to cruise about a metre above the coral surface and using visual recognition technology, it will look for the starfish. When it sees one, an injector arm will shoot out and stab it.

"We need a force multiplier that is actually going to make a difference on the reef, so they can scale it up and actually try and reduce the impact that this pest is having." Dr Dunbabin said.

The robot has been 10 years in development. Dr Dunbabin said computing power was astronomical but "now we can actually run our algorithms on board on this vehicle". QUT researcher Dr Ferars Dayoub took on the task of training the COTSBot to pick out the pest from other sea life through the use of film and 3D-printed models.

The COTSBot should be ready for further development in December and all the researchers will need then is an investor.

Less than Best Reef Sediment Plan

The Queensland Environment Minister Steven Miles has stopped short of issuing an ultimatum to the sugar industry on reef runoff, after slow take up of a voluntary Best Management Practice (BMP) program



"Now if down the track the take up hasn't increased then we will have to look at other options because we do have to improve water quality running into the reef," he said.

Mr Miles said the government's priority was achieving its 2025 water quality targets, which include reducing

nitrogen runoff to the Great Barrier Reef by 80 percent, and halving sediment runoff from key catchments into the reef. But he admitted the targets would be difficult to reach through voluntary programs alone.

Yesterday Canegrowers chairman Paul Schembri urged the government to give growers more time, saying a voluntary program would deliver better outcomes for the reef than any mandated regulations.

Mr Miles said the government wanted the program to work, and it would set take up targets in the future if more farmers didn't sign up. Mr Miles said the scrutiny of BMPs was not limited to the cane industry, and horticulture and grazing programs were also being examined.

Ironically, at about the same time the Federal Government's Reef Program Awards were announced.

Brian and Mark Pressler from Hill End Farms in Bundaberg, won the award in the sugarcane category, for their use of tractor GPS navigation to reduce the amount of driving they do in their fields, to limit runoff. They are also installing improved irrigation systems and variable rate technology on fertiliser bins. They were recognised for using natural ways to capture and trap sediment, so that it does not reach the waterways and flow out to the Great Barrier Reef.

"There are a lot of things we are doing to reduce runoff and sediment, such as contouring and using grass rows and headlands," Mr Buchanan said.

The dairy award was claimed by Yungaburra farmer Dennis Byrnes.

Mr Byrnes was recognised for a project that involved connecting liquid effluent to a solid set irrigation system and travelling irrigator.

The innovation has reduced his reliance on fertilizers, reducing costs as well as the risk of nutrient rich water entering the local water way.

ACMS asks NSW to restore its marine sanctuaries

The Australian Marine Conservation Society (AMCS) is calling on the New South Wales Government to restore and expand the state's marine sanctuaries.



The Baird Government has launched community consultation into their plans to permanently remove sanctuary protections to ten of the state's beaches and headlands.

A 2014 Galaxy poll of 1000 residents across NSW found 90% of recreational fishers support no-take marine sanctuaries.

"The Government's own scientific audit recommended maintaining the current system of marine parks and enhancing the protection of biodiversity in a number of additional areas.

"We encourage the public to have their say and the Baird Government to listen to science and community support for marine sanctuaries," an ACMS spokesperson said.

The marine parks affected include Cape Byron, Solitary Islands, Port Stephens-Great Lakes, and Batemans. The consultation will run until 13 November 2015.

Almost all seabirds will have plastics in their gut by 2050



Researchers from the CSIRO and the Imperial College London have assessed the threat of plastic for the world's seabirds.

They found that nearly 60 per cent of all seabird species have plastic in their gut. In 1960, plastic was found in the stomach of less than 5 per cent of individual seabirds. The researchers predict that plastic ingestion will affect 99 per cent of the world's seabird species by 2050, based on current trends.

Birds mistake the brightly coloured items for food, or swallow them by accident, and this causes gut impaction, weight loss and sometimes even death. "Finding such widespread estimates of plastic in seabirds is borne out by some of the fieldwork we've carried out where I've found nearly 200 pieces of plastic in a single seabird," Dr Hardesty said.

The researchers found plastics will have the greatest impact on wildlife where they gather in the Southern Ocean, in a band around the southern edges of Australia, South Africa and South America. "We are very concerned about species such as penguins and giant albatrosses, which live in these areas," Dr Erik van Sebille said.

Dr Hardesty said "Improving waste management can reduce the threat plastic is posing to marine wildlife," she said. "Even simple measures

can make a difference, such as reducing packaging, banning single-use plastic items or charging an extra fee to use them, and introducing deposits for recyclable items like drink containers.

"Efforts to reduce plastics losses into the environment in Europe resulted in measurable changes in plastic in seabird stomachs with less than a decade."



Microplastics in our food chain



Copepods were put in with fluorescent polystyrene beads measuring 7 to 30 micrometers in diameter. They confuse the plastic granules with food and ate them. Planktonic crabs and oysters also consumed these microplastics, part of the degraded remains of the

many millions of tons of plastics that enter the water each year. They can remain in their intestinal tracts for up to one week if the zooplankton do not have access to actual food. There are concerns the plastics, and the toxins they attract are entering our food chain.

Seastars dying of Disease

Recent observations of mass seastar deaths have sparked a request for help

From: "LUCY CHAPMAN" <lchapman@deakin.edu.au>
Date: 28/09/2015 9:16 am
Subject: Breaking News- We need your help!
To:

Hi everyone,
I am a former University of Adelaide student currently undertaking honours at Deakin in Geelong, however I am based at the Victorian Marine Science Consortium in Queenscliff. My project involved the use of two seastar species; the native eleven armed seastar, *Coscinasterias muricata* from Portarlinton and the invasive Northern Pacific seastar, *Asterias amurensis* from Williamstown.

Upon collection of both of these species on Monday last week, both species rapidly declined in health within 48 hours. Very few individuals have survived. Note that individual species were kept separately. A second sample group was taken on Friday, with most deceased over the weekend.

This health decline has also been observed in the wild population of *C. muricata* in Portarlinton and Indented Head by a fellow VMSC researcher. I will also be going into the field this afternoon.

We are currently trying to investigate the cause of this health decline, however, based on symptoms and discussions with other researchers we believe it may be sea-star wasting disease (SSWD). This disease has previously been seen in the U.S. and is currently effecting the sea star populations in China. This would thus be the second outbreak globally in the last three months. This disease has an extensive geographic range and can infect a number of sea star species.

Symptoms include behavioural changes such as curling and twisting, loss of appetite, lesions, loss of turgor, limb autonomy and death, this is followed by rapid degradation or "melting". I have attached some images of my lab specimens to give you a better idea.

At this stage, we are just hoping to reach out to as many fellow marine personnel to help in the surveillance of this issue and or source any information regarding these symptoms or disease. Keep an eye out and let me know if anything occurs or is observed in South Australia.

Many thanks,
Lucy Chapman



Eleven-armed sea star, *Coscinasterias calamari* (native)
Symptoms: loss of appetite, twisting and crossing of arms, inability to maintain turgor- "melting" out of water and "swelling" in the water, loss of limbs and death.
Lost limbs degrade rapidly.



Northern Pacific sea star, *Asterias amurensis* (invasive introduced species)
Symptoms: turning up of arm tips, detachment from surface (i.e. rocks) - they appear to be falling off, loss of appetite, loss of turgor, loss or partial degradation of limb, lesions, total loss of limbs and death.