

MARINE *Life*

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Our Goal

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

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Cover photo, Andrew Newton



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Southern right whales learn migration from Mum



Southern right whales learn where to go feeding and breeding by following their mothers, rather than by instinct.

DNA sampling found the same mothers returning to the same breeding grounds, and teach their calves where to go.

The study shows the southern right whales that breed in the Great Australian Bight, Tasmania, Victoria and NSW are genetically distinct and not mixing.

Southern Right Whales use to clog the Derwent, up to 40 whales at a time, but they were nearly hunted to extinction. They study shows that groups of Southern Right whales don't readily spill over into new areas. They won't readily repopulate even if overall whale numbers increase.

"The Tasmanian population is part of the east coast stock that we think are the ones that are still the most in peril because they are a remnant population," Professor Harcourt said.

Eroded Paradise –Byron Bay Sea Walls

Source UNSW, Byron Council, ABC

Cyclone Oswald in 2009 is being wrongly blamed for the erosion of one of Australia's most fashionable seaside addresses. Who will now pay for the remediation?



Since settlement, the Byron Bay coastline has had a long history of coastal erosion after storms and as a result suffered major losses to its beach dunes. The properties that lie along

Belongil Beach have lost significant amounts of land. Geobags were put in place at the end of 2001 but have been falling apart.

The long running policy of the Council has been to let nature take its course and to conduct a "planned retreat" from affected areas as issues like rising sea levels exacerbated erosion. It requires owners to remove houses built after 1988 when the sea is threatening them. Then it started to threaten properties with an average \$10 million price tag and the policy has changed despite public protests. One of the owners tried to reclaim his lost land, causing a fight with Council. He spent around \$1.4 million on litigation and rebuilding temporary works.

According to UNSW the problems at Belongil Beach's are due to the engineering works erected further east along the coastline. A rock wall and groyne were erected to halt the effects of erosion along the main beach at Byron Bay, and to protect the Memorial Pool, car park, and town centre. UNSW notes "...like many of these structures, this was built without the knowledge of how it might adversely affect the coastal alignment".

Now Byron Shire Council's plans to build a 105 metre long, \$1.2 million, rock wall as part of interim beach access works at Manfred St, Belongil Beach. Three owners were asked to tip in \$100,00 each towards part of the cost. The owners are angry at paying \$100,000 each for a temporary wall that might have to be removed if State coastal policy changes. Byron Residents' Group is concerned that money raised will lead to a paid parking scheme to finance the wall. "Beach access could be easily fixed at Manfred St with a wooden or metal staircase as is seen on beaches all over Australia. This would be a cheap option that would not cause the erosion of the beach that rock walls do." Environmental groups are angry at the lack of an environmental impact statement (EIS) to accompany the works. The works have been approved under the *State Environmental Planning Policy (Infrastructure) 2007* and have required a Review of Environmental Factors (REF).



Initially the Office of Environment and Heritage would not support the construction of a rock wall at Belongil unless there was an approved sand nourishment program in place to offset erosion. However, Environment Minister Rob Stokes over-ruled that decision after resident complaints, so construction can go ahead without the need for a sand transfer scheme.

The long-term options include sand pumping from Cosy Corner at Tallow Beach, on the other side of Cape Byron, the solution used for Tweed Heads and Broadwater in Queensland. Mayor Simon Richardson said the existing Belongil Beach will be lost unless sand supplies are replenished.

"The Office of Environment and Heritage has basically stated their position that rock walls shouldn't be built along Belongil unless a system like this is in place," Cr Richardson said. "The idea of taking thousands of metres of sand from that iconic surf beach, over the National Park to Clarkes goes counter to what I think is the prevailing environmental feeling in our community," "Environmentally they're incredibly risky without really deep investigation, and of course they're massively costly." It is estimated that a system to pump sand from Tallow Beach would cost around \$2 million to build with an annual running cost of \$300,000 – \$500,000.

Another option is a series of groynes – rock walls that would run perpendicular to the beach to capture the sand as it moves north, similar in size to the rock wall at Brunswick Heads.

Another Byron Shire councillor defended the existing rock-wall plan. Cr Diane Woods said "There's plenty of beach there with the existing rock walls". "We're not doing anything new here. "We're just completing a rock wall that's almost completed, only there is about 100 metres of it to do. "You've got a home there and you want to protect it, you should be able to take those measures ...It's a no-brainer in my view".

Not sure about that, I do know that once you start altering the coastline with longshore drift obstructions, the erosion and the spending never stops.

I notice the foreshore home of a prominent TV celebrity was recently put on the market. Need a cheap house in Byron? The price is \$10 million and falling, just like the dunes out the front.

Fish look out for their spouse

Photo Jordan Casey

New research from the ARC Centre at James Cook University has found that pairs of rabbitfishes will cooperate and support each other while feeding. This was thought to be impossible for fish.

“Reciprocal cooperation”, which is doing a good deed in the hope of later reward is assumed to require complex cognitive and social skills. Skills that fishes have been deemed not to have [a few humans lack it too].



One rabbitfish of a pair will look out for their partner while feeding.

“There has been a long debate about whether reciprocal cooperation can exist in animals that lack the highly developed cognitive and social skills found in humans and a few species of birds and primates.” Dr Brandl says.

“By showing that fishes, which are commonly considered to be cold, unsocial, and unintelligent, are capable

of negotiating reciprocal cooperative systems, we provide evidence that cooperation may not be as exclusive as previously assumed.”

Co-author, Prof. Bellwood, also from the Centre of Excellence for Coral Reef Studies, says that our perception of fishes as cold scaly automans is slowly changing.

“Our findings should further ignite efforts to understand fishes as highly developed organisms with complex social behaviours,” he says.

“This may also require a shift in how we study and ethically treat fishes.”

Dredging fails to clear Swansea channel



In February, the state government completed a \$2.5 million dredging project at Lake Macquarie, but already boats are already starting to run aground at a rate of about one each day

Lake Macquarie's marine rescue organisation says there needs to be more scientific research into dredging the Swansea Channel to prevent more money being wasted.

But despite creating a 60 metre wide channel, more than three metres deep the dredging has largely been a failure.

The government had previously said the dredging project was part of a long-term strategy that involved annual maintenance, estimated to cost an additional \$360,000 a year.

The department spokesman said a report on Swansea Channel navigation noted that “ongoing maintenance dredging would be necessary due to the dynamic nature of sand movement through the channel”.

He said recent hydrosurveys had shown “some shoaling of sections of the navigation channel”.

Deputy Unit Commander at Marine Rescue Roger Evans said not enough is known about why the channel silts up so quickly. “It doesn't seem to be a wise investment.” “It really needs a scientific approach to look at the damn thing,” he said.

REALLY!, what a novel idea.

Rockhopper Penguins



Rockhopper penguins are the most widespread of the crested penguin, with a circumpolar distribution. Despite that they are considered vulnerable.

Source, Worldwildlife.org

At a number of sites (Falkland and Campbell Islands, Tristan da Cunha and the Antipodes) these penguins have declined substantially. At Campbell Island the decline has been in the order of 94%. The reason for these declines is thought to be rises in sea surface temperature (due to global warming) which has affected the prey stocks of rockhopper penguins.

The population at Macquarie Island is estimated to be in the order of 100,000 to 500,000 individuals. A thorough census is required to establish whether numbers are similarly declining.

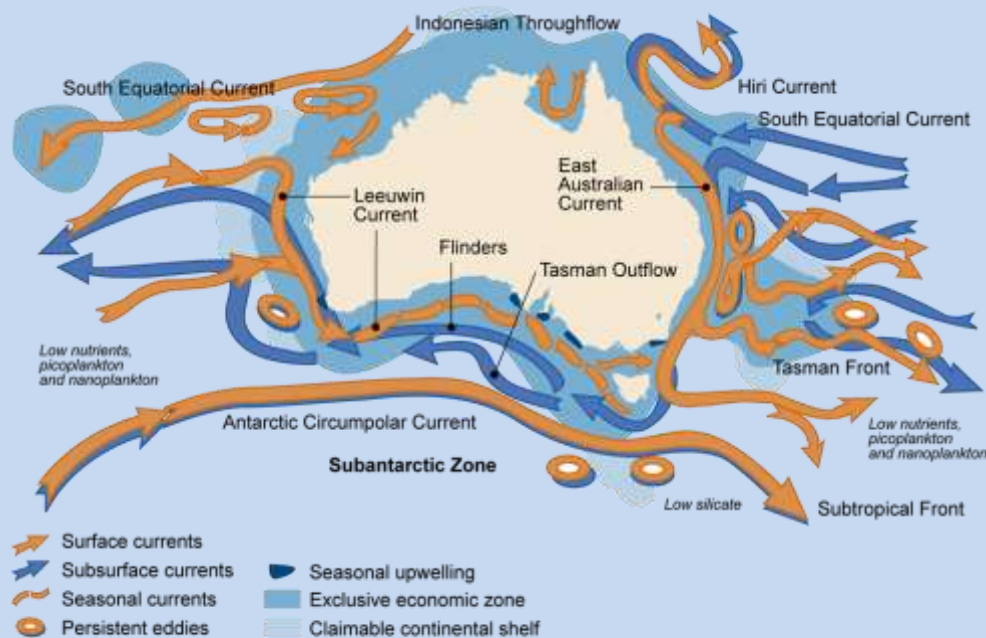
Rockhopper penguins are very similar in their breeding biology and foraging behaviour to the royal penguins. Males return to the island in mid-October and females a few days later. Nests are established (with most returning to the same nest sites and mates) and two eggs laid. Females take the first incubation shift while males go to sea to forage after having fasted for approximately four weeks. On their return the females depart for a foraging trip. Rockhopper penguins eat predominantly euphausiid krill, fish and squid.

Chicks fledge at the end of February. At this time adults go to sea to fatten for the moult, which they undertake in early March. After finishing the moult they depart the island in late April.



Rockhopper, like royal penguins, are migratory and depart Macquarie Island at the end of the breeding season. Where they go during this period is also unknown. During the breeding season they feed in the Polar Frontal Zone in similar waters to royal penguins, although they do not travel as far. The places they feed change with the stage in the breeding season.

How do Australia's Oceans work? - Oceanography



Source: Adapted from CSIRO in Australian Government Department of the Environment, Water, Heritage and the Arts⁷

As the earth spins the water moves. It radiates out from the equator in eddies that bump against land masses and slowly head towards the poles. While they may be rich with life in the tropics they are quickly depleted of nutrients as they travel south. They bring clear and warm water to our coastlines.

There are four major currents in Australian waters: the East Australian Current (EAC), the Leeuwin, the Antarctic Circumpolar Current and the Indonesian Throughflow. These currents have a big impact on marine life, especially in determining where eggs and larvae of animals will go. If they are taken to unsuitable areas they die, affecting the productivity of reefs and commercial fisheries many years later. These currents are changing as the globe warms and are altering the pattern of our marine life. Warmer currents allow tropical species to 'invade' new territory further south, to the detriment of many species.

East Australian Current (EAC)

Water from the tropics moves southwards down the Australian coast. This current is quite noticeable if you travel well offshore. Divers visiting offshore wrecks, or boaters with motor trouble, will be swept away by a 4 knot current in any spot away from the calming influence of the shallow seabed near the shore.

The EAC brings water that is warm, clear and free of nutrients. That's great for water activities but a poor source of food for marine animals. However, just like any stream the EAC has eddies, caused by factors like the shape of the seabed. These eddies suck up nutrients from the seafloor and cause localised blooms of plankton that feed fish, seabirds and sea mammals. When the winds blow onshore, the end result is often mass strandings of jellyfish and other planktonic animals on NSW beaches.

Off northern NSW the current stream splits (the Tasman Front), with half of it bathing Lord Howe Island in a mix of warm and colder water. The rest of the EAC moves southward towards eastern Tasmania, sometimes only reaching the north eastern tip, at other times almost to the southern tip of Tasmania. As the globe warms, a strengthening current is making Tasmania's cold water species compete with new species. It is now warm enough for some of them to breed there. It gives us an insight into what might happen if global warming were to uniformly heat up all of the world's ocean by the same amount.

Leeuwin and Zeehan Current:

If the EAC is all about summer fun at warm beaches, the Leeuwin Current (LC) is strongest in winter. The LC flows down the Western Australian Coast to Cape Leeuwin before travelling east across the Great Australian Bight. In stronger years it can reach the west coast of Tasmania when it is known as the Zeehan Current. It can even round the southern coast and travel as far north as Freycinet Peninsula in eastern Tasmania. It is the longest current system in the world. The LC causes massive eddies that are often 100km across. These are often created by wind-driven counter currents flowing in the opposite direction including the Ningaloo, Capes and Flinders Currents. It has a big influence on stimulating some fisheries. The number of tropical species seen at Rottnest Island, or at the Busselton jetty observation

station will vary depending on the strength of the LC and its counter-currents. When a heat wave hit the Indian Ocean in 20xx, the LC brought this warm water south, causing damage to corals, seaweed beds and fisheries in Western Australia.

Antarctic Circumpolar Current

The 20 000-kilometre-long Antarctic Circumpolar Current is considered to be the powerhouse for global climate. It connects the Atlantic, Pacific and Indian Oceans with an eastward flow equivalent to 150 times the combined flow of all the world's rivers. This is an ocean current created by density and temperature variations in the water and flows well to the south of Australia. As the Antarctic water begins to freeze, very cold and salty water is left behind. The density of this water becomes quite high and it sinks below the surface layer. It moves deeper into the ocean, and also moves toward the equator. Eventually this water will warm, and as it does, it rises to the surface bringing with it nutrients from the deep seabed. It feeds huge quantities of krill, migratory fish, birds and marine mammals.

The Indonesian Throughflow

This system of currents brings warm water from the Pacific to the Indian Ocean via Indonesia. This is unique because it is the only area in which warm water from the equator flows from one ocean to another. It is an important source of heat transport to the Indian Ocean and affects regional sea surface temperatures and rainfall, including the Asian and Australian monsoons.

Are the oceans stable or changing? - ENSO

Australia's weather is influenced by many climate drivers. A natural cycle known as the El Niño–Southern Oscillation (ENSO) has a very strong influence on year-to-year climate variability in Australia. It causes many months of warming (El Niño) or cooling (La Niña) weather in the central and eastern tropical Pacific, which in turn changes Australia's weather. The ENSO cycle loosely operates over timescales from one to eight years. The warmth of recent El Niño events has been amplified by background warming trends which means that El Niño years have been tending to get warmer since the 1950s.

El Niño has a strong effect on the intensity of the southward flowing East Australian Current and Leeuwin Current.

During La Niña (cool) years, Leeuwin Current is stronger in the winter, with higher sea surface temperature. Storms drive more rock lobster larvae inshore where they can settle, especially in the areas south of Geraldton. It also makes nutrient lie deeper in the water so that the wind-driven upwelling is less effective. This seems to reduce larvae settlement north of Houtman Abrolhos Islands. It also seems to disrupt seabird breeding and the seasonal migration of whale sharks.

Unlike our farmers, scallops in Shark Bay love the low rainfall during an El Niño year. During the spawning season there is much less mortality caused by flushing of fresh water after rain.

Off the South West of Western Australia, stronger current patterns sweep away eggs and larvae of pilchards, Australian salmon and herring but strangely the climate variations seem to help whitebait. Stronger currents take eggs and larvae further, so the survivors can settle in more distant areas. Although Australian salmon can suffer off Western Australia, more settle along the distant sections of the southern coastline of Australia.

On Australia's east coast it is an El Niño event that strengthens the Eastern Australian Current in the summer. On the plus side it causes a greater abundance of black marlin off northeast Australia. Two years after an El Niño event, damselfish, strombus shells and green turtles seem to breed well. On the down side, there are significant decreases in seabird populations of the southern GBR as a result of reduced availability of food for hatchlings. Banana prawns are harder to catch in the Gulf of Carpentaria as they are less likely to be flushed out of the drier rivers.

The environment is often able to recover from these intermittent impacts. More serious are extreme events that cause damage to marine habitats and may be increasing in frequency as the world warms. El Niño events lead to an increased likelihood of unusually warm waters which leads to coral bleaching during the late summer-autumn of the second year of El Niño events in the Great Barrier Reef. This has contributed to the loss of over 50% of the coral cover in inshore reefs since the end of WWII. There has also been the virtually total loss of giant kelp (*Macrocystis pyrifera*) off the east coasts of Tasmania associated with major El Niño events. The animals that depend on these habitats then also suffer.

Warmer waters also allows tropical species to settle in new areas, where they fail to establish if the water is too cold, but begin to breed if change (such as climate change) has made the area more suitable. These are new areas where they often face little competition. Some key species are able to alter the habitat, especially when they breed in very large numbers. They can devastate large areas. This has occurred to large parts of Tasmania's east coast due to the invasive NSW black urchin. Tropical fish can also eat out seaweed beds off the Western Australian coast.

Upwellings – Hotspots for marine life

Upwellings and downwelling describe mass movements of the ocean, which affect both surface and deep currents. These movements are essential in stirring the ocean, delivering oxygen to deep water, distributing heat, and bringing nutrients to the surface.

Upwellings are common close to the coast when winds blowing along the coast displace water causing eddies that replace the displaced water with water from the depths. The nutrients that reach sunlight at the surface can be eaten by photosynthesising plankton. These phytoplankton (tiny alga) form the base of the ocean food web. Upwelling regions are less than 1 per cent of the world's ocean by area, but account for greater than 20 percent of the global fish catch.

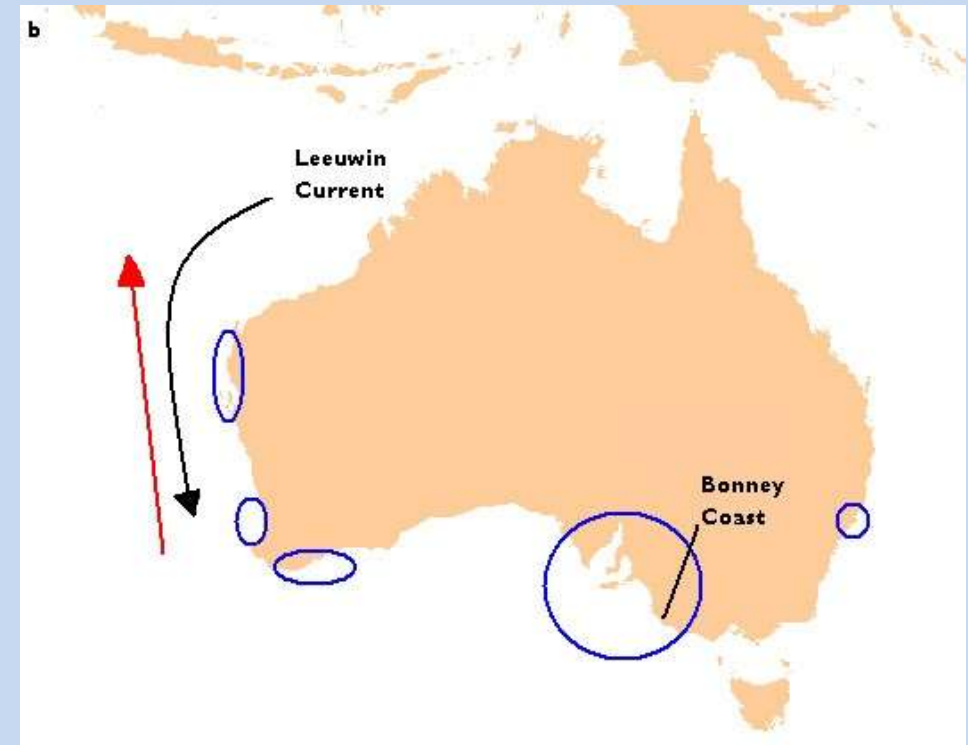
Upwelling also occurs when surface waters diverge, such as where a major current splits. Currents can also cause localised small upwellings where the seabed topography disrupts current flow. You can see the effect on a micro-scale when diving or fishing around a rock, the upward movement of water will draw up nutrients. This then attracts school fish and invertebrate filter feeders wanting to feed on the denser marine life in the water column. The rock will be swarming with life like schools of baitfish, while the seabed around it is relatively bare.

Australia has relatively small upwelling areas due to the dampening effects of its major currents. Regional-scale upwellings occur in WA, where the East Australia Current leaves the east coast off Sugar Loaf Point NSW, and in SE Australia, including the Victorian Bonney Coast.

These upwellings are important food sources for plankton, fish, whales, seabirds, dolphins and seals. They support an active whale watching

industry. Blue whales can be seen on offshore charters off Portland in Victoria.

Where major upwellings occur in other parts of the world they create huge fisheries, but Australia's coastline is relatively low in fisheries productivity. It is important to remember that while Australia may be as big as South America it can only support a tiny fraction of the fishing carried out just off the coast of Chile. A big Australian fishery is measured in thousands of tons, in Chile the anchovy fishery is measured in hundreds of thousands of tons.



Our temperate waters are becoming tropical, but it's not all beer and BBQ's

Ocean temperatures off Sydney are just decades away from becoming "tropical". Modelled winter sea surface temperatures will consistently exceed 18 degrees C between 2020 and 2030. And summer sea surface temperatures will consistently exceed 25 degrees C between 2040 and 2060.

Source UNSW



Eastern Australia waters represent a climate change hotspot, with warming rates occurring twice as fast as the global average. A key reason for this is a strengthening of the East Australian Current.

Other oceanic hotspots around the world include southern Japan, south east USA, south east Africa and eastern South America. All

these regions have in common the influence of strong ocean currents running close to the shore bringing warm tropical water.

Tropical fishes are becoming increasingly abundant and are already a common feature in Sydney during the late summer months.

Algae-eating Surgeonfish such as the convict fish are now found off Sydney in the late summer.



The biggest losers are underwater algal forests. They provide food and shelter to hundreds of species, but they need cool water to survive. High temperatures can directly stress algae by damaging the machinery that supports their survival. Warmer

tropical water also carries fewer nutrients, which the algae need to grow.

The harmful effect of warm-water fish on temperate reefs is most evident in southern Japan and the eastern Mediterranean, where algal forests have dramatically declined.

The invasion of tropical rabbitfish in the eastern Mediterranean has created eerie barren areas extending over hundreds of kilometres. These new habitats support less than half the species found in the nearest algal forests.



Divers Dr Fiona Tomas and Dr Adriana Vergés set up feeding experiments in barren Adrasan, southern Turkey, where algal forests are nowhere to be found. Murat Draman

Similarly, off southern Japan over 40% of algal forests have disappeared since the 1990s. Increased annual grazing rates by tropical rabbitfish and parrotfish appear to be the culprit. Now corals dominate at many sites. It has resulted in the collapse of abalone fisheries, and

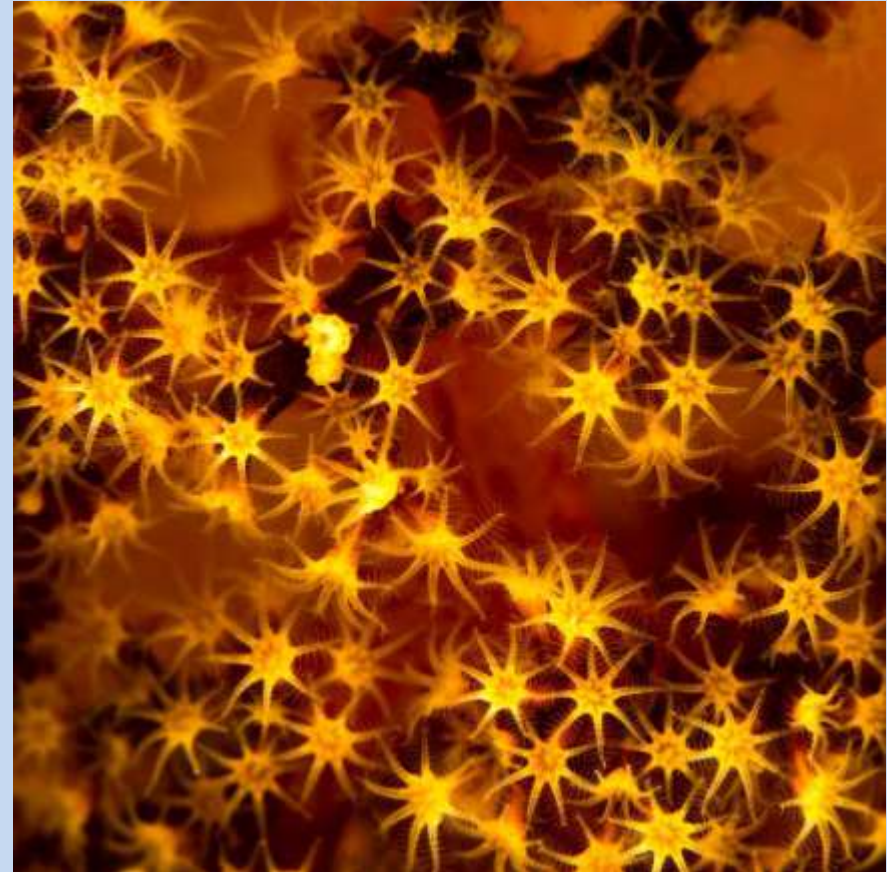
the cultivation of other commercially important species such as the Japanese amberjack is becoming increasingly difficult.

So what can we do to stop temperate algal forests turning tropical? To prevent further dramatic changes we ultimately need to reduce our CO₂ emissions.



Algal beds have already been replaced by corals in Tosa Bay (Southern Japan). a) Abundant algal forests in the early 1990s; b) overgrazed algal beds in October 1997; c) Rocky barren area in January 2000; d) Coral communities present in January 2013.

Eureka Award – Some Prize Winning Photos



Soft Coral, by Gary Cranitch

Winner of the 2015 Eureka Prize for Science Photography

Nature Survivors - The Neogene Period

23.03 million years ago - 2.58 million years ago.



The Neogene officially covers about 20 million years. During this period, mammals and birds continued to evolve into roughly modern forms.

Early hominids, the ancestors of humans, appeared in Africa. Some continental movement took

place, the most significant event being the connection of North and South America at the Isthmus of Panama. This cut off the warm ocean currents from the Pacific to the Atlantic Ocean, leaving only the Gulf Stream to transfer heat to the Arctic Ocean. The global climate cooled considerably. The earth was locked in an Ice Age. Glaciers, growing from the ice caps, reached down as far as Ohio in the United States.

There was new plant growth in the ocean. Kelp forests grew in cool waters where the plant could attach to rocks and coral. Otters and other animals evolved to live in this unique ecosystem.

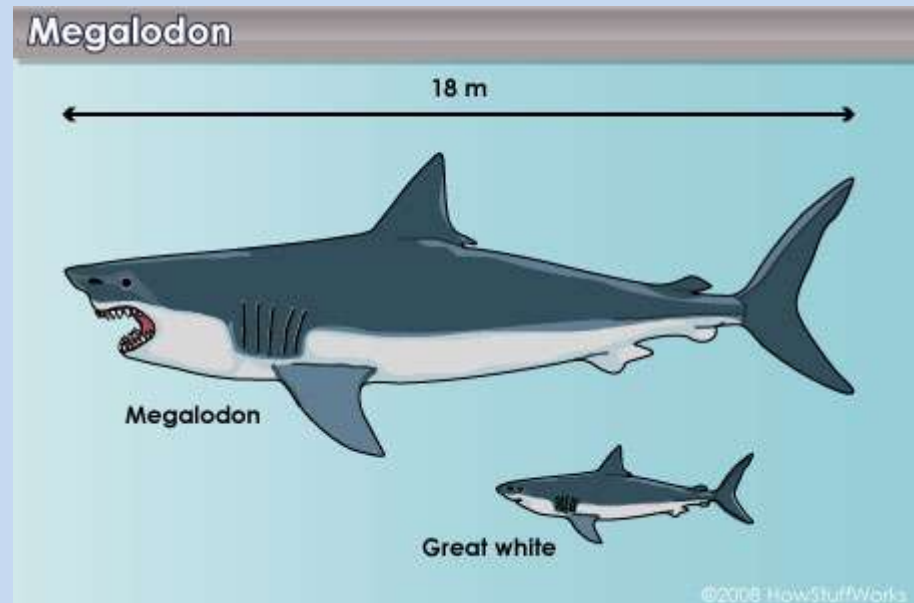
The dugong, a marine mammal related to the elephant and modern manatees, lived in large numbers. Modern versions of these animals still feed on the plants in the Great Barrier Reef off the Australian coast.

Sharks developed new species. One of these new sharks was Charcharodon



Megalodon, the largest of all the sharks. It grew to be nearly 50 feet long dining on whales and dugongs. Fortunately it did not survive into the modern era.

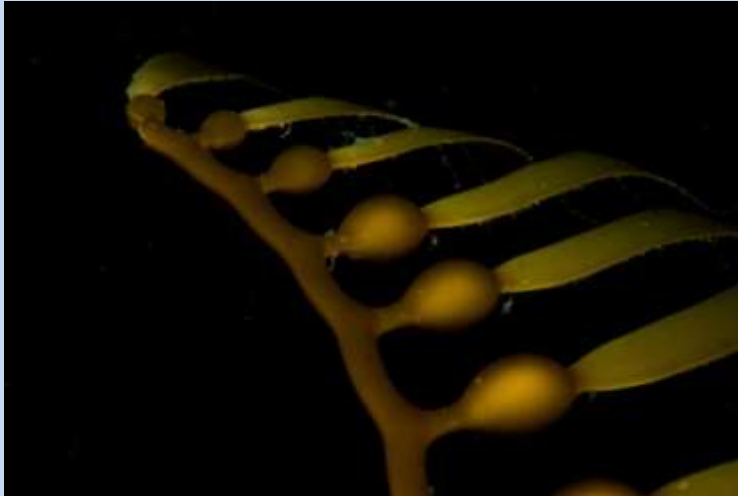
Although whales started to evolve in the preceding Paleogene period, they didn't become exclusively aquatic creatures until the Neogene, which also witnessed the continuing evolution of the first pinnipeds (the mammalian family that includes seals and walrus) as well as prehistoric dolphins.



Kelp Beds – End of the line after 20 million years?

U.S. studies suggest today's kelp beds are less extensive than those in the recent past

Source; UC Davis News, <http://ccb340.weebly.com/giant-kelp.html>



The plant grows from its tips with the blades dividing up into new blades
Photo - Benita Vincent

Kelp forests occur worldwide throughout temperate and polar coastal oceans.

Giant kelp growth is so dense that they are known for their kelp forests, which are home to many marine animals that depend on the algae for

food and shelter. Giant kelp is one of the fastest growing organisms on Earth able to manage up to a metre a day in growth and in depths up to 30 metres in Tasmania.

Unlike most plant root systems that carry nutrients back and forth through the plant, the holdfast that anchors it to the rock doesn't carry nutrients or water. It thrives in cooler waters where the ocean water temperature remains below 21 °C.

Giant kelp can live up to 7 years. The kelp forests are considered to be some of the most diverse and productive ecosystems on the planet.

They love a cool climate and tripled in size from the peak of glaciation 20,000 years ago to about 7,500 years ago. Then as the world has warmed they have shrunk by up to 70 percent to present day levels.

Kelp forests around Californian offshore islands peaked around 13,500 years ago as rising sea levels created new habitat. Since then they have declined. The kelp along the mainland coast peaked around 5,000 years later.

On land, scientists can reconstruct the history of a forest or grassland from fossilized pollen or leaves. But kelp do not make pollen, and marine sediments do not preserve a good record of the plants.

The researchers used depth charts of the southern California coastline and information from sediment cores on past nutrient availability to reconstruct potential kelp habitat as sea levels changed over the last 20,000 years.

There was transition from an extensive island-based kelp forests to a mainland-dominated system. When compared to the archaeological record it gave a more complete picture of California's coast. People lived off the produce of kelp forests when resources on land dwindled, and those changes are recorded in shell middens.

Climate-driven shifts in kelp ecosystems impacted on human populations that used those resources.

Kelp is still diminishing around the world as our globe warms. The eastern Australian coast is a hot spot for these changes due to warm tropical currents bathing these regions.



Lonely Dugongs

Dugongs are very social animals and although normally timid, when isolated they will latch on to humans for company.

Divers in Shark Bay W.A. report that single dugongs will approach boats and check out fishermen or divers, then move off when their curiosity is satisfied.

When single males are permanently isolated they can actively seek out human company. This has happened in Vanuatu since the 1970s, and the local villagers encourage these contacts. The inhabitants of Resolution Bay in the island of Tanna did this with one male dugong. From 1988, "Pontos" took up residence in the harbour and eventually became a tourist attraction. He would come over when local children called it. He would even catch a turtle and bring it back to the villagers. It would also allow children to climb on its back. This behaviour was filmed by Ben Cropp.



I tried to visit "Pontos" in the late 1990s, but was turned back by the eruption of a volcano no less. The volcano never bothered "Pontos" but he started to get annoyed with the increasing flow of tourists and could play rough. He would grab swimmers with its powerful pectoral fins, bite diver's flippers and air hoses. As he got more aggressive he could

be seen tossing turtles into the air in frustration. He died of natural causes in December 2002.

Another dugong has since become famous, on the remote neighbouring island of Epi. This animal was befriended by two Canadian women in the early 1980s, who swam with and stroked the dugong, which seemed to seek out human contact. The villagers in the area aren't very impressed as he gets in the way of their spearfishing trips. If a villager dives toward the sand below, the dugong will follow and mimic their



In Australia, GBRMPA has published a Code of Conduct that includes recommendations not to enter the water or approach within 40 metres of a dugong, but to let it come to you if it wants to. Speeds of less than 5 knots within 100m of a likely dugong area, or any sighted animal, are also advised.



behaviour. It will not allow villagers near its tail but is otherwise very placid. In his remote spot he doesn't get too many tourists.

The other known tame dugong lives on the small inhabited island called Loh. It interacts with the children. The animal is summoned using a paddle and it will also take children for rides on its back.

The main thing is that an animal will come over if you are snorkelling and it is interested, otherwise leave it alone.

Sooty Oystercatchers at the Five Islands Nature Reserve

Per <http://www.sossa-international.org/forum/content.php?162>



In 1994 members of the Southern Oceans Seabird Study Association (SOSSA) began studying the Sooty Oystercatcher on Five Islands Nature Reserve.

In New South Wales the Sooty Oystercatcher

population is small, only 100 individuals were recorded in counts conducted by Wader Study Groups in the 1980s. From 1994 to 1998/9 there was a total of only 16 pairs of Sooty Oystercatchers breeding on Five Islands Nature Reserve near Wooloongong.

The Sooty Oystercatcher (*Haematopus fuliginosus*), inhabits rocky shorelines and coastal islands along the coast of Australia. It forages in the intertidal zone, for a variety of molluscs and crustaceans. It appears to breed mainly on marine islands only. Non-breeding birds inhabit rocky shore areas all year round.

The breeding season of the Sooty Oystercatcher on Five Islands extended from mid-September till February or more rarely, March. Sooty Oystercatcher nests in a variety of sites. Nest sites were rarely found more than 20 metres from the water's edge. Nests are constructed amongst patches of pebbles, shells, rocks and vegetation, most are often quite exposed. Eggs are usually laid in late October, with chicks usually fledging from the islands by mid-February. On the Five Islands two eggs form the usual clutch though one egg clutches are often encountered. Chicks are primarily fed Limpets and Chitons. The feeding station soon becomes littered with discarded shells.

During incubation and for much of the chick rearing period, males were rarely observed in their breeding territory. Generally one of the chicks is lost to starvation/ siblicide / act of God soon after hatching, usually within 6 or 7 days. The female bird usually has a good view of its surrounds and in most cases is able to skulk away undetected at the approach of possible danger.

Kelp Gulls (*Larus dominicanus*) and Australian Ravens (*Corvus coronoides*) have been observed taking Sooty Oystercatcher eggs. At the sounding of an alarm call given by the female/one of the parents, chicks will hide under rocks, often with water breaking over them, and will remain hidden until given the all clear by one of the parents/female. Chicks can swim quite well at this age and will also dive to escape danger. They can swim well under water, using their wings like a penguin's flippers when underwater.



Chicks disperse with adults from the islands at 7-8 weeks of age. The chicks remain with the parents for up to a further 8 months, before eventually being driven away. Generally ousted birds will join up with a nomadic flock of non-breeding juvenile birds, which is referred to as the



"Club". All chicks are banded with metal and colour bands. Any sightings of banded individuals can be reported to SOSSA headquarters and would be greatly appreciated.

RAN helps install a hut in 2011 for seabird research

Sydney's seaweed is in rehab

***Phyllospora comosa*, commonly known as crayweed, once grew in abundance along Sydney's rocky shores until the 80s when sewage wiped out 70 kilometres of forests.**

Source; ABC Environment, UNSW, SIMS



Since then, crayweed has been unable to re-establish itself, having been crowded out by the green seaweed, *Caulerpa filiformis*.

The Sydney Institute of Marine Science (SIMS) and the University of New South Wales (UNSW) is re-establishing crayweed forests between Palm Beach and Cronulla.

Since 2011 they have collected adult crayweed from outside of the Sydney and tie it to metal grids. The divers then transplant the grids. "Not only did the crayweed survive, they actually reproduced at rates higher than what we've seen in existing natural populations," says Dr Marzinelli. "We've found crayweed patches 10 to 100 metres from our initial grids," says Dr Campbell.

The crayweed restoration project will also be launching a crowdfunding campaign to raise money for expansion. It costs about \$30,000 dollars a hectare". If we were able to turn the restoration project into a community-based project, it would be way cheaper. I reckon it could be cut down to \$10,000 a hectare."

Dwindling fish stocks require changes

It will soon no longer be viable to use the resource for both food and products like fertiliser.

Source include ABC and NOAA



According to scientist Reg Watson, European and African fisheries are seeing stocks plummet because of overfishing. Around Europe where the North Sea can't sustain all of the fishing that European fleets want, they have moved further out and now use areas off Africa. All of the Pacific in Asia has been fished heavily. Now the Chinese fleet do a lot of fishing off the African coast too. About a third of this is ground into powder to be used in fish meal for aquaculture, livestock feeds, fertiliser, nutritional extracts and in pet food.

"We don't value eating those smaller fish from further down the food web, you know, which unfortunately they are some of the most valuable fish in terms of health benefits and they're also some of the easiest on the ecology if we eat those kinds of fishes."

NOAA says potential alternatives for fish farms already in use include soybeans, barley, rice, peas, canola, lupine, wheat gluten, corn gluten, other various plant proteins, yeast, insects and algae. Other sources that show great promise include waste from bio-energy and bio-plastic production and fish processing waste. Farmed seaweed has significant growth potential as a source of food and fibre for both aquaculture feed and human consumption. The Supertrawler is an effort by a fish meal processor to move in to catching whole small pelagic fish for human consumption, ironically for Africa where European supertrawlers have decimated local stocks.

This illustrates some of the difficulties with any fisheries policy initiative. It all makes some sort of sense strategically, but it has become a bumper sticker salesman's paradise. It has run aground on perceptions about the exceptional character of the fishing. The Supertrawler has put a spotlight on by-catch and resource competition issues that existed well before the "Supertrawler" arrived, and will continue well after it has left. All I know for sure is that our little moggie wants his share, he's willing to fight anyone for it, and he doesn't listen to reason. But then he's a cat.

The Old Bones of French Bounty Ships

In terms of its merchant navy and shipyards, France always played second fiddle to the U.K. and was in the habit of propping up its merchant fleet with generous subsidies.



A particularly generous new law was enacted in 1893 which offered lucrative bounties for any French-built sailing ships on long-haul voyages. It was an odd thing to do, just as steamers were beginning to make sailing vessels obsolete in international trade. The French romantically saw merchant sailing ships as the best school for seamen, who could then be drafted into the navy during war.

The subsidies were based on gross tonnage per thousand sailed miles, meaning that it was REALLY profitable to go on very long trips to places



like Australia in REALLY big ships, even if you didn't have a cargo. This half-baked pork barrelling cost French taxpayers hundreds of millions of francs until it was dropped in 1902. Perversely, the French shipyards just upped their prices by the amount of the subsidies.

Not all of the shipping and navigation bounties went to shipowners. Five per cent was to be retained for sailors' insurance giving them basically workers compensation, quite a novel idea.

This unshakeable attachment to sail meant that French-built ships were some of the last sailing ships to be built. They represented the last gasp of sail, and the pinnacle of merchant sail technology.

The ships would often arrive off the W.A. coast in ballast and run before the wind to Adelaide for wheat, or to Hobart around the wild and rugged South West Tasmanian coast. Although Hobart had little cargo it provided a downwind re-victualing spot for the voyage up the East Coast of Australia. The telegraph office there also allowed them to receive orders, often to collect coal at Newcastle, or produce at Sydney. From there the cargo could be taken to South America. At the west coast ports of South America, a load of nitrate fertiliser could be collected for Europe.





Between 1898 and 1921, there were 288 arrivals in the Port of Newcastle by 145 different French sailing vessels as well as 190 Sydney arrivals by 109 vessels. At any one time, in these Australian ports there could be a dozen or more French ships at anchor with up to 250 French sailors cramming waterside pubs.

Most men came from rural and coastal areas of Normandy and Brittany. A subsidy didn't alter the life of a sailor, cramped, wet, cold, tiring and dangerous. Many masters feared a long voyage to Australia, being concerned about shipwreck and possible crew desertions in Australian ports. The Southern Ocean trade winds weren't called "The Roaring Forties" for nothing. In 1908 the Hobart Mercury reported,

"The *Germine* had a sensational voyage of 122 days from Rotterdam. Terrific gales were experienced off Cape Leeuwin, and at one time the vessel was completely submerged by mountainous seas which washed aboard. The wheel was smashed, and the compass carried away. The chartroom door was smashed, and two boats damaged. The man at the wheel was forced into the chart room and fell down the stairs. The chief officer had a miraculous escape from being washed overboard".



Ships often limped in to Australian ports to repair storm damage.

The crew could at least drown their sorrows,

French bounty ships were unusual in allowing the entire crew to consume alcohol, and gave out a daily ration of wine.

Several vessels were lost on Australian reefs, or foundered out off the coast in storms.

New Caledonia was also another popular destination full of danger, where ships were attracted by the nickel mines. These islands became "the tomb of French sailing ships" causing 12 shipwrecks because of the lethal mix of coral reefs, currents, cyclones and poor mapping.

The presence of all these ships competing for available trade excited a lot of jealousy. After 1900, French ships became so numerous it distorted



the freight market and merchants made the most of it, playing off the French, German and British owners. Sailing ship freights were down to loss-making levels even for the subsidised ships. One distortion was replaced with another, as ship owners grouped together to fix rates.

The French bounty ships died off slowly after the subsidy

ended, the sailing ships were retired gradually due to pressures from steamers. Many of the remainder were lost to accidents, or were sunk by German raiders in World War I. By 1916 French visits to Australian ports were rare. Most of the last sailing ships were withdrawn from service in 1921 because of rising costs, including legal requirements for an eight-hour day for mariners.

French Bounty Ship Wrecks



W.A. - "Ville de Rouen"

The 4-masted barque "Ville de Rouen" was built by Ateliers & Chantiers de la Loire at St Nazaire in France. The barque had sailed from Cardiff, Wales on 25 July 1901, under the command of E. Barthelweld. She was loaded with a cargo of coke, pig iron and firebricks for the Fremantle Smelting Works. Also on board were 1 600 bottles of wine.

The "Ville de Rouen" struck the reef that now bears its name 4.8 km off the mouth of the Moore River. Visibility was restricted at the time, due to bright moonlight being reflected off a heavy mist. The crew made it

ashore soon after the vessel struck, taking with them some ship's gear, food and (of course) some wine for afters.

Offers of help were refused, but the barque was soon pounding on the reef. As the breeze freshened the "Ville de Rouen" began to drift, and finally came to rest with decks awash in 7.2 m of water near the southern end of the reef. Because of the distance from Fremantle, the cargo was not considered of enough value to warrant salvaging.

The wrecked hull has now collapsed with the topsides still visible, together with masts and spars lying just to the south and near the stern. There are also a stockless anchor, anchor chain, a donkey boiler, a two-cylinder steam winch and a number of other artefacts on site. A quantity of firebricks concreted together can also be seen. A stockless anchor off the "Ville de Rouen" was recovered by local divers and is on display at the Guilderton Country Club.

W.A. - Barque "Gael"

The "Gaël" was built by Atelier & Chant de la Loire at St Nazaire in 1901. She was a steel barque of 2198 tons.

The "Gaël" was carrying a full cargo of cement, when it left London on 23 May 1909 for Hobart. The "Gaël" met with strong winds and heavy seas in mid-August, and on 17 August it was found to be taking on water. There was 1.2 m of water in the hold so the steam pumps were put into action. This proved unsuccessful and the water continued to gain. The crew resorted to buckets, but still the water continued to rise. Captain Meteye jettisoned much of the cargo. After five exhausting days they captain decided to abandon ship, 170 nautical miles south-west of Cape Leeuwin.

The three ship's boats were lowered, but one was smashed against the side of the barque. The boats stayed by the sinking "Gaël" for two days until the barque sank at about 11.30 p.m. Five days later the entire crew reached safety in two boats. The captain's boat landed near Hamelin Bay, while the second, in charge of the mate was picked up by SS "Vigilant" off Cape Naturaliste.



N.S.W. - "Adolphe"

The "Adolphe" was named after one of the sons of the A. D. Bordes & Sons shipping dynasty. She was built by Chantiers de France of Dunkirk. Where the ships were built was a very poor area apparently, and the local people relied greatly on shipbuilding jobs.

The master of barque, Captain Layec was born on December 7, 1871, at Ile-aux-Moines in Brittany. In 1894 he had been a second lieutenant on the giant five-master ship "France". He also commanded at least seven well-known barques of the Bordes company.

The "Adolphe" was wrecked at the entrance to Newcastle Harbour in 1904. The barque was approaching Newcastle after 85 days at sea from Antwerp.

Trying to negotiate the dangerous harbour bar in heavy weather, one of the tug towlines snapped and the barque grounded on the sunken wrecks on the Oyster Bank to become a total loss. The men of the port's rescue lifeboat "Victoria II" saved all 33 crew on board. The "Adolphe" was only on her fourth voyage (and her first to Newcastle) when she was wrecked.

Layec's maritime career seems to have come to an abrupt end a few years later. He and several other captains of the Bordes company questioned the arming of their sailing vessels (with two guns) in WWI. Layec and the other captains believed their wind-driven vessels would be regarded as warships by German submarines. The likely outcome would be the "useless massacre" of the sailing ship crews. Layec and the others were immediately relieved of their commands. Layec was "taken off" at Taltal, Chile, on January 14, 1918, and later repatriated to France by steamer.



Over the years the Newcastle breakwater was extended with the "Adolphe", embedded in it. It is still a popular local tourist spot.

TAS - "Ville d'Orleans"

This 2560 tons steel barque was built at Nantes, France in 1901. The barque was on a voyage from Glasgow to Brisbane with a cargo of iron rails, under Captain Pivert.

The "Ville d'Orleans" experienced heavy weather throughout her voyage.

In about mid June 1902, while crossing the Indian Ocean she began to leak. After another big gale on 7 July her position became serious. The boats were provisioned and plans were made to abandon her.

Unexpectedly, the French barque "Gael" [later to founder herself two years later] appeared over the horizon on a voyage from Madagascar to Hobart. The "Gael" stood by and the following day the captain and crew of twenty-seven, equipment and gear were transferred from the sinking barque before she was abandoned.

The vessel foundered 550 km south-west of South West Cape, Tasmania, on 8 July 1902.



S.A. – “Notre Dame d'Avor”



The “Notre Dame d'Avor” was a steel barque of 2646 gross tons and was built in 1902 in Nantes. She was on a voyage from Rochefort to Port Victoria SA, to load wheat.

The farmers had to till the land very early because it was slow work with horses. The exposed fields contributed to very thick dust storms that could virtually block out the daylight. The thick haze almost obscured Wardang Island. The “Notre Dame d'Avour” was coming up to Port Victoria when she was wrecked. They sailed into the south-west corner of Wardang Island.

Wireless messages were sent out, and these reached the “Jessie Darling”, which was in the neighborhood and she went to the assistance of the disabled ship. On Sunday morning the captains of the “Laennec” and the “Versailles”, which were in port, boarded the “Notre Dame d'Avor”. She was then lying on a sandy bottom and rolling slightly. The tug “Eagle” was dispatched to the scene of the mishap. They spent months trying to salvage it.

On the night of 1 May the wreck was gutted by fire after one of the salvage crew accidentally dropped a kerosene lamp (the locals reckon it was a deliberate insurance job), and the resulting fire spread to a store of paint and oils.



The hull was visible for a long time mast and the spars were still upright in the 1930s. The wrecksite now consists of a shallow jumble of steel visible from the surface. It's more easily visited on snorkel.

S.A. – “Montebello”

This steel barque of 2284 tons was built in Nantes, France in 1900. Captain Alphonse Kervegan was on a voyage from Liverpool and Brest for Hobart. He was first heading for Port Pirie to load wheat. On 18 November 1906, the weather was rough and misty on the south coast of Kangaroo Island. It had been a rough voyage and one of the men was injured, having fallen from the rigging a few days before.

The second mate was in charge as they headed inshore, unaware they were 60 miles off their intended course. The master of the “Montebello” claimed that the navigational error had been caused by a strong current and the direction of the wind on the previous day. The light at Cape Borda wasn't working to verify his course. He was later found to be negligent.



Suddenly, the "Montebello" went aground near the Stunsailboom Station in the early hours of Sunday. The ship collided with a reef not far from shore. One brave sailor, Louis Yrebot, swam at great peril with a small line to shore. Increasingly stronger lines followed and a flying fox was established between a large boulder on the shore and the mizzen mast of the stricken ship. All the remaining crew, including a badly injured sailor from the earlier accident, were transferred safely to shore.



Five of the French sailors then made their way through remote and wild countryside and stumbled upon Tilka Hut. Here they were almost immediately found by Percy May, a wallaby trapper, who happened to be passing while delivering a letter to one of the two Tilka sisters, Carlina and Christina, on Stunsailboom Station. The Tilka Sisters looked after the sailors while Percy May made a dramatic 100 mile journey on horseback, that required swimming two rivers, to raise the alarm.

The barque was soon reduced to a total wreck. The Stunsail Boom River Station shearing shed is fabricated from the ship's timbers. Montebello's steam boiler is wedged between granite rocks on the foreshore at Shelly Beach. Underwater, her remains lie well scattered in fifteen metres.



Opah, the warm-blooded fish

The opah (moonfish) has a global range that includes the southern waters of Australia and swims at depths between 10 and 450 metres, and its warm-blooded

Source ABC



The opah, Lampris guttatus. (NOAA: Ralph Pace.)

Some fish that can warm their blood a little include some species of tuna and the Lamnidae family of sharks which includes the Great White. It's only localised and temporary though. Recent research has shown that the opah is the only known fish species to be whole-body endothermic, or warm-blooded.

Dr Nick Wegner says this trait gives the opah distinct advantages as a deep-sea predator. "It will increase its performance in cold environments - it can swim faster, has faster reaction times and better visual resolution than a lot of its prey,"

It was an "opportunistic find" after blood vessels were found that "weren't supposed to be there". Wegner says the fish flaps its fins to produce heat.

As the warm blood leaves the core and travels to the gills where it warms the blood passing through the gills.

Fat also surrounds the gills, heart and muscle tissue. The researchers found the opah was able to warm up an extra 5 degrees Celsius higher than the surrounding water.

Museum of Victoria senior curator of Ichthyology Dr Martin Gomon says it suggests the related southern moonfish would likely have the same feature. The southern moonfish is known to be active despite living in cold, deep waters.

"The discovery just shows how little we know," he says.

Last year a moonfish washed up at Stanley on the NW coast of Tasmania, although they are more commonly seen in tropical Australia.



Tagging opah, NOAA

Reefs gets 'Lego dentures'

Source <http://www.reefdesignlab.com/>(and no we didn't get paid for an ad]



When you let the teeth you got for free collapse due to damage and neglect, you get ceramic replacements. This might have to happen to some of the world's ailing tourist reefs.

Australian designer Alex Goad has created a system of modular ceramic components to rebuild coral reefs. The Modular Artificial Reef Structure (MARS) can form a base for plant and animal life to return to habitats destroyed by climate change, pollution and destructive fishing.

"What may have taken 100 years to restore naturally can be reduced to an estimated eight to 15 years

using the MARS system." MARS was created for a non-profit organisation called Reef Design Lab.

"Both tropical and temperate reef systems are under constant pressure caused by human activity and weather-related destruction, these irreplaceable coral reefs are some of the most bio-diverse and uniquely fragile ecosystems on the planet." Said Goad

The porous ceramic modules clamp together to form three-dimensional lattice structures mimicing the calcium skeletons of dead coral. They are filled with marine-grade concrete and reinforced with composite bars to add weight. Ceramic is the perfect material to encourage the colonisation of sensitive corals and has an extremely long lifespan underwater. "The modular construction process has a strong relationship to Lego," Goad said.

"Because of the modularity of the product the system can be built in any shape and size depending on the requirements of the damaged reef structure," Goad said. The structures can be deployed to the bottom of shallow waters from small boats by divers, rather than using large machinery. MARS has already been trialled in Port Phillip Bay as well as sites in Cairns.

Once in place, the system first attracts small bottom-dwelling fish. Those dependant on sunlight such as corals and seaweeds attach to top surfaces, while filter feeders like sponges cling to the undersides. Fish and crustaceans move in after a few months, when plant coverage has become thicker.

"Many people do not agree with the use of artificial reefs for restoration, believing that reef systems should be left alone to restore themselves," said Goad. "In many cases this is an acceptable practice, however when the rate of destruction far exceeds the rate of natural coral growth then we must intervene."

"MARS is simply one of many restoration techniques for reef environments and is in no means a complete solution, but it does provide a unique opportunity for humans to physically help to restore damaged reef environments leading to a more informed and caring community," Goad said.



Icebreaker for Science? New government, new attitude.

We all know that science is just a haven for lefty 'do gooders', a sort of a sheltered workshop for hysterical doomsaying people who missed out on a career in international finance? Well, I'm sure that isn't the actual public policy narrative, but we could be forgiven for thinking that after a savage round of funding cuts for science under the former Prime Minister. Now Australian politics has lurched back to somewhere near the centre.



While it takes a long time to procure a new ship and the plan isn't new, the latest Prime Minister thought it important enough to travel all the way down to some godforsaken place without noticeable economic advantages called Tasmania, to announce a big spending commitment for another godforsaken place without noticeable economic advantages called Antarctica.

The new icebreaker is way faster, bigger, stronger, more stable and has lots of onboard laboratories. There is a James Bond moon pool for launching and retrieving remotely operated vehicles. A multi-beam bathymetric echo sounder will go 'ping' when you press buttons and it

will enable seafloor mapping. I suspect it will also have killer coffee machines, an essential collaborative research tool.

It is hoped that the coffee machines will attract other countries to use the vessel, underwriting some of the costs and getting us 'back into the game' in terms of the big science projects everybody, but too often not us, are currently doing.

Collaboration is the name of the game, with bigger projects, bigger supplies orders, more scientists from more countries. If Americans are addicted to space, Australia's aspirational adventure playground is probably the Antarctic. A lack of resources has led to us being left behind in areas where we were previously the leader of the pack.

You can't please everyone though. If it actually goes ahead the construction would take place in the Netherlands. Mr Turnbull said building the ship in Australia was not feasible. "The business of building icebreakers ... is not located in Australia, it's clearly a northern hemisphere industry and a specialty," he said. Odd, we previously seemed to have the brains and skill, as the "Aurora Australis" was built in Newcastle. The actual issue is that it is a speciality where our manufacturing capability has declined and where we are not price competitive. Maybe through research we can find some new specialities.

Let us hope that this announcement is a fresh start, but as the CSIRO has found, a new ship makes a great media release, but doesn't give you money for the crewing, fuel and supplies to do anything much other than leave it tied up at the wharf between hull scrapings. We'll wait and see.

Next thing the government will be wasting our mining royalties on art, culture, feeding starving kiddies in Africa, modernising the economy and other leftist hobby horses.



We might have modernised our research vessel but it still relies on the efforts of lots of Douglas Mawsons.

NSW Shark Worries - Its Wild Out There

Public meetings on shark management try to put things in perspective and boost public confidence after recent shark attacks.



It is reported that Great White Sharks have been "gathering" on the north coast in numbers and close to the shore. "We still believe and hope that this is an unusual phenomenon and that next year we will be down to a normal situation, but time will tell," head of the shark research division at the New South Wales Department of Primary Industries NSW, Dr Peddamores, said. "There is some feature that has brought the (bait balls) closer to the coast, we don't know what drives that here on the East Coast of Australia, usually it has to do with environmental conditions like sea surface temperature," Dr Peddamores said.

Lennox Head was the scene for a large public meeting between the state's Minister for Primary Industries, scientists and other interest groups. The Premier has pledged that the north coast would be part of Summer trials of new detection or deterrent technology.

At this stage, there will be no mass slaughter on top of the usual beach netting program that is used around Sydney's beaches. "What we want to do is take away all the information from the shark summit, hear from the north coast before we come out with our response, prior to Summer this year," Mr Blair said.

Smart Drumlins and Cleverbuoy (detection) systems were being explored by Dr Vic Peddemors,. "I really believe this is the dawn of a new era, I really believe that we are on the cusp of very very exciting new developments and that in the next 5 to 10 years we will have a new strategy in place in New South Wales and we will be leading the world in the way ahead".

Ballina's Mayor David Wright said there was initially shock and anger over the recent shark attacks but they realised there would be no quick fix. "... it's good that the minister did listen, he didn't fob me off and I've spoken with him a number of times and I am just pleased that government is actually listening about this, they are taking this really seriously," Councillor Wright said. "Last year in the July to October period the jet rescue boat went out four times for shark incidents, this year they've gone out 54 times in the same time period," Councillor Wright said. There have been more than a dozen recorded incidents and attacks in the region so far this year, including a fatal attack at Ballina's Shelly Beach in February.

Implementing an idea used in WA, swimmers, surfers and the general public will now be able to track 10 tagged sharks with an online map set up on the NSW Department of Primary Industries website.

At another scientific forum in Sydney, 70 shark experts from around the world discussed the findings of an independent review of shark deterrent and detection methods. The report looked at the effectiveness of personal shark shields, electric and physical barriers and a shark spotter program,. One idea is an electric cable running along the beach enclosing a body of water, assumedly the magnetic fields discourage the sharks. They found that most new technologies need further testing. "We are not going to put devices into the water to

placate people's fears. We will only put devices in the water when we are convinced that they work..." Dr Peddemores said.

Other experts like Newcastle marine ecologist David Powter criticised beach netting. Shark nets are used along 51 beaches from Newcastle to Wollongong, including 10 along the Hunter coast. They pose a "real risk" to other marine life. "About 80 to 85 per cent of the animals that they catch aren't animals that are dangerous to people," he said. "So to look for alternatives that might be able to provide safer beaches without the damage, I think that is a great idea."

Dr Powter said shark nets are nothing more than a security blanket. "I think the public think that shark nets are a complete enclosure barrier," he said. "The average shark net is probably only about 150 metres long and is about six metres high, but set on the bottom in 10 to 12 metres of water. So if you look at any beach you have got hundreds of metres either side of that shark net that are open so in no way, shape or form is it a complete barrier".

Water minister Niall Blair ruled out any type of culling program. "...Great White Sharks are protected so we don't cull Great White Sharks... [also] it just hasn't been that successful...".

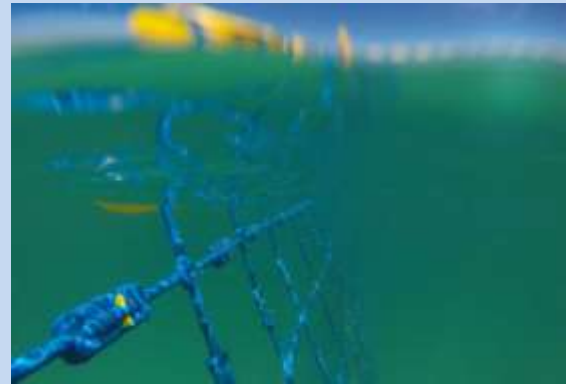
Byron Bay wasn't to be left out as local inventors set to work on their own sonar alarm devices. A Byron Bay man was killed by a shark last year. This week researchers set out for the first of a series of tests in and around Byron Bay. "We're testing sonar devices to see what a shark looks like on a sonar device, so we're heading out to the Julian Rocks where there's a lot of grey nurse sharks at the moment to see what they look like and hopefully have a baby whale swim underneath and we can determine what each of them look like on different sonar devices," Ms Pendergast said. The sonar device will detect a large object and trigger an alarm.

Inventor Ric Richardson wants people to treat the ocean like a wildlife park in Africa rather than an amusement park. "It's like living on the edge of the Serengeti, our aquatic version of Serengeti," he said.

We should at this point give Dr Peddemores the final word, "I think it's really important though to remember that these events, although they are extremely traumatic, they are also extremely rare".

New Eco Barriers

Ballina's Lighthouse Beach on the New South Wales north coast, has been identified by the State Government as a trial site for new shark barriers.



The inventors claim that no marine life had been caught in the plastic barriers, which have gaps of 25-30 centimetres, to allow small fish to swim through.

"The only instance we've had is a stingray was able to get around the barrier at high tide and came up onto the beach when the water came up, but that problem

was rectified," he said.

The barrier installed at Coogee Beach runs 50 metres out from the shore and across 300 metres parallel to the shoreline. They are also leased to the City of Cockburn, in Western Australia. He promoter said he could have a system ready for Ballina before Christmas.

It is made from plastic and nylon attached to two pylons on the beach and two pylons offshore.

The barrier is also anchored to the ocean bed with large chains. Yellow floaters sit on the ocean's surface so that the barrier is visible from above the water.

He said a barrier that size would cost about \$350,000 and last 10 years.

"I wanted to create something that could coexist in the marine environment without harming or trapping marine life, as well as giving people peace of mind," he said.



Coffs Harbour TAFE puts an artistic highlight on ocean debris

Photo Iona Donherty



"Trans Migration" is a project for Sydney's Sculpture by the Sea exhibition that highlights the harmful effect of plastic debris on Pacific seabirds.

Coffs Harbour artist Jeremy Sheehan has collaborated with others, including students from Coffs Harbour TAFE, and artists from 22 nations including the Pacific

Islands. TAFE students made life-sized, wire-framed birds with 'skeletons' of plastic waste. Other artists added local materials.

The exhibition highlights the mutton bird, whose annual migration from Coffs Harbour to Asia is being affected by ocean plastics. Mutton birds leave Coffs Harbour for Asia in April each year. In the past 40 years, the mutton bird population has dropped by 30 per cent.

"The mutton bird is hardwired to pick up anything they think may be food," Mr Sheehan said. "Sadly the adults pick up ocean plastics and bring [them] back to the burrow, where they regurgitate it and feed it to the chicks. The chicks then don't put on enough muscle mass and end up starving to death or become too weak to take off."

When the sculptures are installed at local beaches they will decay and leave only a plastic skeleton behind.

Squid count to off Rapid Head

Department of Environment divers will check how many eggs are left by spawning squid.

It is the first count since the Rapid Head Marine Sanctuary was established at Second Valley SA.

Marine parks senior scientist Simon Bryars said, "From about October to December is when they generally get the most squid coming in ... we've got to make sure we get there at the right time and at the peak of the spawning season," Dr Bryars said.

"We're trying to capture some information ... to see whether the sanctuary zone's having the desired effect.

"What we're expecting to see is [for] the sites inside the sanctuary zone there'll be more squid and they'll lay more eggs compared to sites outside where there's still fishing allowed."



The hope is that the calamari are going to have a higher reproductive output in sanctuary zones.

The "Super El Nino" Threat



Photo: XL Catlin Seaview Survey)

Scientists have predicted a monster El Nino in Australia this year and a warmer ocean. This could mean droughts and coral bleaching on a massive scale.

The two strongest El Ninos that we know of occurred in 1982-83 and 1997-98. Both events had significant global impacts including droughts, floods and cyclones. Average sea surface temperatures were 1.5 degrees Celsius above normal from July to September this year.

The first mass coral bleaching occurred in 1998, when about 16 per cent of the world's reefs were affected. Up to 10 per cent of the corals on Queensland's Great Barrier Reef died. The Great Barrier Reef narrowly avoided a worse event in 2010 due to cooling local storms. The world's third mass coral bleaching will happen early next year and may damage up to 38 per cent of the world's coral reefs. Global Change Institute's Doctor Tyrone Ridgway said the likely 2016 event was going to be "potentially worse in terms of temperature than what we saw in 1998".

Bleaching is a phenomenon that turns corals white and eventually leads to coral death. UQ's Global Change Institute director Professor Ove Hoegh-Guldberg said "If the stress does dissipate fairly rapidly after the event there's a good chance the corals could recover but until we experience the temperature into the summer we're not going to know what the extent is going to be."

Queensland Environment Minister Steven Miles said "... sadly if the world doesn't do what we need to do to limit global warming then this is going to get worse."

About 60,000 jobs in Queensland and up to about \$6 billion worth of income depend on tourism. Col McKenzie from the Association of Marine Park Tourism Operators is worried the event will scare visitors away from the Great Barrier Reef. After the 1998 event he had phone calls asking, "Is it worth us coming to the reef?"

The Australian Bureau of Meteorology said the El Nino should peak in late December before declining in the first quarter of 2016.



Talks on Antarctic krill and marine parks

The annual meeting of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) will continue Australia's efforts to establish a system of marine protected areas in East Antarctica, and manage krill fisheries in the Southern Ocean.



Director of the Australian Antarctic Division, Dr Nick Gales, said "Krill are a cornerstone of the Antarctic ecosystem and the staple diet of many animals, including seals, whales, fish, squid, penguins and other seabirds".

"While current harvests are well below the total allowable catch set by

CCAMLR, demands on the fishery are expanding as krill is increasingly recognised as a valuable resource in medical products and supplements, and as fish meal."

"The krill management system is still under development and Australia is working closely with all CCAMLR nations to ensure larger predators can continue to rely on krill as their main food source."

Ensuring the impacts of climate change are factored in to CCAMLR management decisions will also be an Australian priority.

Australia will also continue its efforts to establish a system of marine protected areas in East Antarctica, previously vetoed by Russia and China. The new proposal provides for managing multiple uses, including fishing.

Ageing Antarctic krill

A new ageing technique that counts annular bands in krill eyestalks will help ensure they are properly managed.

An international team of scientists have won a \$48 200 research grant from the Antarctic Wildlife Research Fund to test and validate the use of eyestalks to accurately age Antarctic krill.

"If the technique works for krill, we'll be able to develop more accurate age-based growth models to improve krill fishery management. We'll also be able to compare krill growth in different parts of Antarctica and we'll have an age-structure baseline against which future changes in krill populations can be observed."

Dr Kawaguchi said many fish and invertebrates record their age in growth rings deposited in structures such as ear bones, scales and shells, but krill do not have any hard parts like this that are preserved when they moult. Krill also shrink if food is limited, and it is impossible to discern fast growing young krill from slow growing old krill of the same length but different age.

The research team will provide the results and techniques to members of the Commission for the Conservation of Antarctic Marine Living Resources, to enable the age-based assessments needed for fishery management.

Krill are thought to live for about five years in the wild, but they have lived longer in captivity.



Tasmania's Beloved Tramp

100 Year Anniversary of the wreck of the "Nord"



The Eaglehawk Dive Centre recently held an event to mark the sinking of Tasmania's most popular recreational dive wreck.

The event included relics, video and slide displays on a rather windy Saturday. It was a good day for talking, which was lucky

as we had on hand a good cross-section of Nord fanatics, from the first team to dive on her (William Wisby), to some of the most recent devotees. It was a great yarn, with some people getting to the wreck for a dive on Sunday. Thanks to Mick for setting it up.

History

The Nord was built by a Kerch based shipping line in present day Crimean, Ukraine as a grain carrier named the "Maria Goriainova". At that time Kerch was booming. In the late 19th century, mechanical and cement factories were built, and tinned food and tobacco factories were established. By 1900, Kerch was connected to a railroad system, and the fairway of Kerch Strait was deepened and widened. At this time, the population had reached 33,000.



The Goriainovs seem to have been a merchant family in the Crimea at the time, and probably major shareholders of the Kertch Mining & Metallurgical Company.

At the time most of the world's steel steamers were built in Scotland. Grangemouth lies on the estuary of the River Forth, on the south-east of Scotland. were there was access to coal and iron. Much local iron ore was smelted locally by Carron Company near Falkirk, and used to make steam engines, ship's fittings and Carronade cannons. By 1814, the

Carron Company was the largest iron works in Europe, employing over 2,000 workers, and it attracted many innovators.

At a shipyard in Grangemouth two versions the first practical steamboat in the world, the "Charlotte Dundas", were built in 1801 and 1803. The technical superiority of the Grangemouth yards was well-known and the Russian shipowners probably knew the shipbuilders. There were many local trade links with the Crimea. The Russians placed an order for two ships the "Alexey Goriainov" and the "Maria Goriainova". They would have a shallow draft to navigate the Sea of Azov and be capable of long voyages with a medium-sized cargo. She was to have all the latest appliances and cost £25 000 each, twice the cost of a similar vessel of the time.

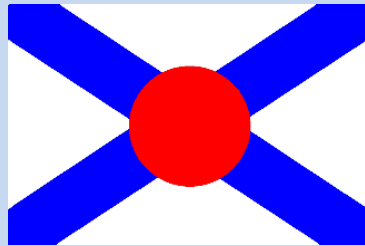
She was built in the Carthage Mid Yard of the Grangemouth & Greenock Dockyard Company, which was more commonly known as the 'Klondyke' yard, as they had knocked out lots of ships here for the 1894 Alaskan gold rush. On 30 April 1900, the hull was laid down and rushed though in five months. They had a full order book and were in a hurry. Alexander Bradley died while building her, probably in an accident.

The vessel then traded around Europe until 1902 when she ran aground in Italy. Although rescued, she was immediately sold to Swedish owners and renamed "Nord". In 1904, she collided with a lightship while trading around the Baltic. In 1905 she was sent to Singapore and then sold to British owners. Her shallow draft and long range would have been ideal for the primitive oil fields of Borneo where the Anglo-Saxon Petroleum Company (a subsidiary of Royal Dutch Shell) held interests.

Far East oil carrier

The "Nord" wasn't a tanker as we would know it. It wasn't until 1910, that the first bulk oil carrier was launched. All previous tankers were steamships that carried oil in barrels and refined petrol (benzene) in tin cases. We still use "barrels" as the main measurement for bulk oil, even though they are no longer used.

There were quite a few oil companies working in Brunei following up promising small oil discoveries. One of them was the Anglo Saxon Petroleum Company. In those days, they were rough camps in the forest, connected by a light gauge railway to a wooden pier.



Anglo-Saxon Petroleum's flag and cap badge

She frequently traded to Australia with cargoes of cased oil and fuel. In Melbourne she was photographed, the only known surviving image of her in her heyday.

In 1915, she was delivering fuel to Hobart in rough weather. With a light cargo and a shallow draft, I suspect she was rolling uncomfortably. The captain decided on a short-cut and hit the Needle Rock, still unmarked on the charts even though it has claimed another steamer two decades before. The bow was stowed in and the waters began to rise. An attempt to get in to Port Arthur failed, and they had to turn back off Cape Pillar in heavy seas. The boiler fires were put out by rising water and she sank in Munroe Bight in 35-42 metres of water, close to the cliffs. The survivors made it to the timber mill then in Fortescue Bay.

Diving the Nord



The Wisby Brothers were local abalone divers. In 1969, they heard about the wreck and bounce dived along the coast until they found it. John had suffered an illness as a child and had a weak heart. He suffered heart failure and died on the wreck.

Others quickly followed, winching plates off the wreck to recover artefacts. As she had no treasure, interest died down until recreational divers rediscovered her in the late 1970s. At that time she was largely intact and going inside was a dark penetration dive. The rudder would swing and creak eerily in the swell.

In the 1980s she was the scene for some epic dives, including two visits by white pointers while on the deco line, and some comedies of errors

with anchor lines and deco stops. Fortunately, no-one was ever harmed. In about 1996 the damaged forecastle area collapsed and the hull cracked in the middle. Within a few years the whole front had collapsed exposing her engines. She is still a big, clear and interesting dive with lots of growth and fish, but she requires a bit more imagination to recognise. The stern area is still intact, for now.



The easiest way to dive this relatively deep wreck is through the local charter operators. Eaglehawk running regular trips there for suitably qualified people. Apparently a kelp forest has re-sprouted nearby and the seals on Cape Pillar also provide plenty of second dive options.

