

# MARINE *Life*

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## Our Goal

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

## The Crew

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**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, Point Lonsdale, Port Phillip Bay, Victoria by Phil Watson**



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# Features and Creatures

Fish grazing and ocean acidification	3
Climate Change in SE Australia	4
Litter, Sharks and Rays	5
Humpbacks in Trouble	6
Dolphin	7
Jurien Bay stinks	8
SA MPAs and toxic algae	9
Ulladulla pest seaweed blooms and dead rays	10
Sydney harbour	11
Port Jackson Sharks	13,14
Urchin barrens, new research	15
Natures Survivors	18
Leprosy Island in NT	20
The missing Hebe	21
Hope and its Treasure chests	24
Swans, penguins and gulls	26

### **The Apocalyptometer**

Please be advised that the following symbol indicates an article likely to- depending on your point of view, 1) alarm people who are annoyingly positive and cheerful and would prefer to be cut off from reality. OR alternatively it's just an article for the doomsaying wowers



The following symbol indicates an article that is either 1) a suitable cheap placebo to be taken just before the whole place goes to hell, OR 2) finally something positive and cheerful.





## National News

### Seaweed Forests Overgrazed by Cute Fish (the rat bags)

Image: Claudine Lamothe

**While in some areas coral reefs are being overgrown by algae as fish are removed, in cooler areas an invasion of new tropical fish is overgrazing the seaweed.**



In Japan and the Mediterranean the intrusion of tropical fish has caused widespread loss of canopy seaweed and the trend could be global. In southern Japan increases in ocean temperature and a rise in tropical fish numbers

coincided with the dramatic decline in kelp beds. The linking of the Red Sea to the Mediterranean Sea via the Suez Canal in 1869 allowed two species of rabbitfish to migrate. In some places up to 60 per cent of the seaweed was eaten out.

Similar changes could be happening in the US, South Africa, Brazil, eastern Australia and Western Australia. In Western Australia an extreme heat wave in 2011 caused seaweed to die.

It is believed that the southward movement of tropical species prevented the seaweed from recovering as the new fish fed off the small recruit algae.

WA Department of Parks and Wildlife researcher Dr Shaun Wilson was part of the team investigating the trend worldwide. He emphasises that the evidence of this in WA is only anecdotal so far.

## How Can Coral's handle acidification?



Photo: Lakshmi Sawitri

**Biologists have been examining coral's ability to repair damage as oceans become more acidic.**

They studied the branching coral *Stylophora pistillata* which is endemic to the Indian and west Pacific Oceans. They were grown for a few months on glass slides under a range of CO2 levels.

They found that established coral is able to control its own pH (acidity) levels. New growth is less able to control pH, it's more strongly affected by the external environment.

UWA says increasing oceanic acidity, concurrent with rising atmospheric CO2 levels, could prove challenging for corals.

"There are certain stages of growth which are likely more sensitive to acidification—namely things like the larvae and their initial colonisation of the substrate," they said.

"It's going to affect more their ability to compete with other organisms if they're less able to isolate that substrate."

## Rapid warming in south east Australia



Primary Source: EL NEMO SOUTH EAST AUSTRALIA PROGRAM FACT SHEET



### What's Happening

Atmospheric CO2 levels are rising dramatically.

Ocean temperatures in the south east have warmed by 1.4 degrees since the mid 1940s and are likely to rise another degree by 2030 and a further 2.5 degrees by 2100

A 30 per cent increase in hydrogen ion (acid) concentration in south east Australian marine waters since 1750 has been detected, changing the ocean chemistry.

The East Australian Current (EAC), which moves warm water counter-clockwise down the east coast, has strengthened by 20 per cent over the past 50 years and is likely to strengthen another 20 per cent by 2100.

### Biological changes

- Animals with shells suffer from brittle shells in more acidic waters.
- several warm water sub-tropical species south into parts of Victoria and Tasmania, including invasive 'pest' species.

- Drought makes estuarine areas in the south east more saline affecting spawning of species such as black bream
- Species with low tolerance to warmer water temperatures could decline,
- abalone aquaculture suffers from exposure to warming waters, large rainfall events and a higher disease risk.
- Abalone and crays experience competition from black sea urchins.
- Timing of life cycle events such as spawning in abalone or moulting in rock lobster is changing. Cray spawning in eastern Tasmanian has been declining for 15 years.
- warming water temperatures may increase growth rates of some fish in the south (compensating for some losses in northern areas), then they will decline as waters warm beyond their physiological limits.
- Local oceanography will change, e.g. Bonney Upwelling in southwest Victoria are expected to slow, reducing catches in western Victoria and eastern South Australia.

### What fishermen can do to adapt

- selective breeding of aquaculture species to increase tolerance
- managing river flows to optimise spawning conditions for estuarine fish during drought
- adjusting size limits and catches due to changing growth rates.
- Do more research into what will change.
- developing new resource-sharing arrangements between users
- take advantage of any new 'niche' opportunities (eg, marlin charters),
- use finer scale (spatial) assessment and fishery management to optimise yield.
- Rebuild already damaged stocks.
- reseeding, translocation and rehabilitating urchin barrens.

People aren't talking about whether it's happening anymore. It's already happening although the changes so far are only a taste of what's to come. Expect to see fewer scientists arguing with intellectually deaf radio shock jocks who don't listen anyway, but instead using their time more effectively to manage the inevitable changes.



## WA News



### Litter Threat at Cottesloe

**Litter is strangling wildlife at our popular beaches**



According to W.A, beachgoer William Parkinson (also a volunteer with Cottesloe Coastcare) there is a growing issue with litter on W.A. beaches,

*"Most of the debris is caused by unintentional littering by beachgoers in summer. Items I have found include*

*swimming goggles, flippers, surfboard fins, watches, fishing gear, plastic children's toys and leg ropes. My gripe is with tennis balls and sunglasses. This year I have picked up hundreds of each, and filled the green wheelie bins along Marine Parade as I am sure rubbish truck drivers have noticed".* Mark Binns took these photos while snorkelling along the reef in south Cottesloe. Mark's photos of a flathead, slowly dying, caught in sunglasses are graphic evidence of the damage our rubbish can do to marine life. Mark was able to free the fish.



### WA Shark Culls Kaput

You've seen the news, no more WA shark culls due to an adverse decision by the EPA. The WA government decided to save its dollars and not appeal. Regretfully there has since been another serious attack, So...how about the netting programs in NSW and Qld? Are you up for a swim in a real underwater wilderness?

## MPAs in mangroves protect young rays, well mostly .

Image: Christa Rohrbach

**Mangrove Bay in Ningaloo Reef MPA is a key habitat for tropical rays.**

The study, led by Charles Darwin University examined Mangrove Bay, one of the northern-most sanctuary zones in the Ningaloo Marine Park.



Fifty-one acoustic telemetry receivers were deployed and residency patterns of 16 juvenile rays from four different species were studied. They found that mangrove forests can potentially be key ecosystems for the development of tropical rays. The Mangrove Bay Sanctuary Zone did protect core areas of activity for these juvenile rays. However, despite the concentration of activity here, juvenile rays do move through a larger area that goes beyond the sanctuary.

Marine protected areas can protect the vulnerable life-stage of rays, but "may not be suitable for large marine animals which may have broader movement patterns."

Dr Cerutti-Pereyra recommends increasing the geographic area of monitoring across Ningaloo Reef to thoroughly study the ray's movement patterns and assess how effective the sanctuaries and protected zones are for the populations of tropical rays.

"Also using population genetics to study populations of these species across the park...[would provide] information on a longer time-scale, which may show if these populations that we see as 'isolated' actually overlap their ranges."



## Starving Humpbacks



***Increasing strandings of humpback whales in Western Australia, especially of calves, has been linked to poor diet. Possible climate change impacts?***

In 2011, 17 strandings were recorded, between Exmouth and Stokes Inlet, east of Esperance. The Department of Parks and Wildlife has released the results of those post mortems. "Of the animals we examined and conducted post-mortems and the blubber fat measurements, all but one of the calves was in a severely malnourished state. The mothers were likely also suffering from severe malnutrition." The calves had also been born further south than usual.

Humpback whales in the southern hemisphere predominantly eat krill. Climate change is likely to reduce the seasonal extent of sea ice which will in turn have a negative impact on the quantity of juvenile krill.

"A reduction in the abundance and distribution of feed in the Antarctic may have resulted in longer foraging time which could have led to a delay in migration times and reduced fat reserves in some pregnant humpback whales. Thus resulting in some calves being born south of the regular breeding grounds and in poor body condition." Dr Holyoake says



## Humpbacks die entangled in ropes



***A 10-metre whale carcass was found on a beach in Dampier in July. The department's Rachael Marshall says the rope marks around the whale's body indicate it had been entangled for up to 18 months.***

Whales migrate north to breed in about May each year before returning home to the south in November. Last year, the lobster industry came under fire as 32 whales became entangled in fishing gear during their annual migrations along the WA coast.

In June this year, a number of measures were introduced for fishermen to reduce whale entanglements, such as a requirement to remove slack from pot ropes. Entanglements have since reduced to six whales so far this year. However, average prices and limited catches means only approximately 20 per cent of the lobster fleet is fishing at the moment, and fishermen that are on the water are reporting low whale numbers in general.

Humpback populations have previously increased by about 10 per cent per annum despite ongoing issues like entanglement. Fishermen are confident the new measures will work in reducing deaths.



## Broome's Snubfin Dolphins



***Australia's first endemic species of dolphin was only recognised as a separate species in 2005. Broome, has the largest known population of snubfin dolphins***

Broome was once considered by some as a humid backwater, but is now the focus of heavy pressure from coastal development, as is the entire Kimberley coast.

Alex Brown from Murdoch University's Cetacean Research Unit, is collecting baseline information on inshore dolphins as part of his PhD. He has been gathering data on abundance, distribution and genetic connectivity. The snubfin dolphin is a relatively small species that lives in the waters of northern Australia from Broome, Western Australia, north and east to the Brisbane River, Queensland. The species is strongly linked to the mouths of tidal creeks, rivers and mangrove systems within 10 kilometres of land, in water less than 15 metres deep.

During zigzag boat rides across Roebuck Bay, photos of individuals are taken. Individual dolphins can be recognised from the marks on their dorsal fins. The scientists then use a mathematical model to estimate how many dolphins are in the bay.

"After several months of work in Cygnet Bay and Roebuck Bay, we've now photographically identified over 170 different snubfin dolphins", Alex says.

Scientists also use a specialised dart gun to get small tissue samples from individual dolphins. This allows them to get detailed genetic information.

These small tissue samples help to estimate the level of gene flow (mixing) between dolphin populations in Roebuck Bay and Cygnet Bay. With dolphins being excellent swimmers it was thought that the two bays would be regularly visited by all dolphins in the area. This doesn't appear to be so.

"Preliminary data from over 50 tissue samples collected ... indicate there is limited genetic connectivity between the two populations," Alex says. "This shows a degree of isolation, and suggests that they should be managed as separate populations." This means their losses aren't quickly recharged from surrounding areas if local populations crash.

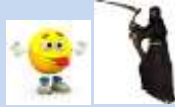
Their quiet little bay is changing and they now share a region with humans hell bent on tourist dollars and ore shipments.

Unlike other dolphins, the snubfin is quite shy and does not ride boat's bow waves. However, the species forms very tight-knit groups and members often become so engrossed in one another that they are oblivious to oncoming boats. Not a great attribute for a place full of tourist boats and millionaire's gin palaces.

Animals with a limited home range and slow population growth often suffer from development. The snubfin has an unfavourable conservation status or and "would benefit significantly from international co-operation organised by tailored agreements". I personally can't see Australians deliberately harming such an iconic animal, especially in shallow waters where we might be able to manage boating impacts, but we do need to be vigilant.

*P.s. Love dolphins as they ARE really cute, but hardcore marine lifers also love endangered animals that look like poo too.*

## A Building Stink at Jurien Bay



***In early August, dead fish and rotting seaweed forced authorities to close a local beach and it wasn't the first time.***



Warmer weather conditions, a build-up of seagrass and low tides in the coastal town's harbour have resulted in the deterioration of the seawater.

"Seagrass comes in and lays on the bottom then sand drifts in and sits on the top of the seagrass and you get an accumulation of rotting material a bit like a giant compost heap forming

on the bottom of the harbour," said Shane Love MP. "Then it begins to leach gasses into the harbour and deplete the oxygen until there's no oxygen left in the water for the fish." The Department of Health says swimming or eating fish caught in the harbour could pose health risks.

The issues with the marina are also affecting high end real estate in the area, with potential buyers scared by the smell. Tourists avoid the area completely, boat owners get in and out as quickly as possible.

Just a one-off incident? No way. This kind of thing has been going on at Jurien Bay for 12 years and the locals aren't happy. The WA Government has tried many times to fix the long-running problem by excavating sand and it hopes an even larger dredging program this year will sort it.

According to the locals, the issue is with the marina. The Jurien Bay Boat Harbour was built in 1988 at a cost of \$10 million, but it ran over budget and there were no works to protect it from northwesterly storms. Over the years the marina's design depth of four metres has shrunk to less than two metres and fish kills started in 2000.

In 2005 and 2006 dredging restored navigable depths for vessels accessing the harbour. A sparsely vegetated area of dunes approximately 300 m north was used as a dump for 41,000 m<sup>3</sup> of dredge material. This area was later revegetated. In October 2007, the Department for Planning and Infrastructure proposed a spur groyne off Jurien harbour's northern breakwater. They then argued they didn't have the money, the project estimated to cost about \$705 000.

Mechanical removal of seaweed last year by raking helped and was cheap compared to construction work.

A data collection program is also being undertaken to investigate water quality, seagrass wrack and fish kill events at the harbour. The data collection program is needed to provide information on local conditions including wind, waves, ocean currents and water levels. This information will be used in computer modelling to determine how to best address ongoing issues with water quality and seagrass accumulation in the harbour over the long term.



The locals won't settle for less than harbour works and are impatient for a solution, but there appears to be no commitment to anything more as yet, I think quite reasonably. For that wad of cash we at least need to know if a groyne would work and what other impacts it might have on the harbour. Shame the scientists weren't called in years ago as we could already have the data needed.

It also shows the value of good planning laws and experienced scientific consultants, all that detested 'green tape'. In effect the taxpayers are picking up the bill for a nuisance created by the failed design of a coastal development.



## Blooms at Broome



***Causes of toxic blue-green algae blooms in Roebuck Bay are being studied.***



The toxic blue green algae *Lyngbya* occurs naturally at low levels in tropical and sub-tropical waters throughout the world. Occasionally pollution can cause it to breed out of control and harm swimmers and marine life.

It is believed that nutrients from Broome's sewerage systems are tending to stimulate blooms in Roebuck Bay. UWA hydrogeologist Professor Ryan Vogwill says *Lyngbya* can be hazardous for marine life. "It can actually kill quite a lot of smaller animals. "Larger animals including humans can have bad skin irritations and really quite serious health effects from it."

In the 20th Century there were no recorded blooms at Roebuck Bay, but in 2000 a massive bloom occurred after cyclone "Rosita" caused Broome's wastewater treatment facility to overflow. The bay isn't polluted normally.

It takes a big rain event to add nutrients to a normally clean bay, the worst one being the first downpour of the season. This "shock loading" of nutrients provides more than 50 per cent of the nutrients found in the water.

The effects of the Broome Peninsula's sewerage systems were also tested. Groundwater is known to flow southward into the bay, so scientists sampled wells and existing shire bores. They found elevated nutrient levels in the groundwater at old Broome. Much lower nutrient concentrations were found in stormwater runoff from newer parts of Broome, east of the airport. "The new developments all have more engineered drainage design structures that do a lot of sediment retention," Prof Vogwill says. As a consequence they seem to be holding back a lot more nutrients.

This is a challenge for councils and home owners. Controlling the available nutrients would starve *Lyngbya* back to harmless levels.

## SA News

### SA Marine Parks scrape across the line

*Per ABC News*

***A Liberal amendment to water down the South Australian Government's marine park sanctuary zones has been defeated in the House of Assembly by one vote.***

Dozens of commercial and recreational fisherman who had earlier held a protest on the steps of Parliament House packed into the gallery to hear the result.

The amendment was voted down despite Liberal defector Martin Hamilton-Smith supporting it and siding with his former party.

The State Government needed the support of Independent Geoff Brock to defeat the bill and he gave Labor his vote.

Conservation groups have declared the defeat of the bill as a win for regional communities, fish stocks and marine life. "In a few years' time, we will look back on the last couple of months and wonder what all the fuss was about as regional communities, and all South Australians, start to see the benefits marine sanctuaries bring".

Executive officer of the SA Rock Lobster Advisory Council, Justin Phillips, says this is a disappointing day for the different fishing industries across the state. "There will be jobs lost in regional coastal South Australia and millions of dollars of export production will also be lost. He says the fishers are not against protecting stock numbers where they work, but it's the no-take sanctuary zones which are causing them concern.

"The sanctuary zones, however, haven't been done on a risk-based approach and that is what we have advocated for the whole way through." "Right now it means that fishers, particularly in areas like Port Wakefield, now have to make very serious decisions about what they do with their businesses, their families. Do they relocate? All those life-changing decisions."

The zones will come into place on October 1, with 84 no-take sanctuary zones.



## Deadly balance at Lake Conjola



### **Silting at Lake Conjola kills pest species but also kills fish.**

Lake Conjola is an intermittently open and closed coastal lagoon in Southern NSW near Ulladulla. It is a very productive fishing ground and a major tourism asset.

Naturally, the mouth of the estuarine lagoon at Lake Conjola silts up, sometimes for years on end. That's unpopular with boat owners who like the better fishing you get when the lagoon is open. In 2001, Lake Conjola was artificially opened to the sea and despite drought conditions remained opened until 2010 when more works were undertaken. It closed again, then opened in March 2013 after heavy rains, only to close again in May 2014. As rain falls the salinity in the closed lagoon drops and sometimes causes dieback of weed and even fish kills. In August this year, one third of the lake's population of rays were killed in the closed lagoon, probably by a rapid cooling of the water to 8 or 9 degrees after rain.

The president of the Conjola District Lake Care Association, Robin Kerves, said dead rays weren't the whole story, a diseased bream had also been found and no blackfish have been caught in the area for months. General fish numbers also appear to be down dramatically. Other local fishermen noted octopus and shellfish had decreased since the lake's entrance closed. Ok, so why not artificially open it to the sea to save the fish and help the boaties?

Unfortunately, the lake is infested with a pest seaweed that carpets the bottom when the lagoon is opened, driving off some fish species and

making fishing a chore. *Caulerpa taxifolia* is a foreign, fast growing green alga, dubbed the 'killer algae' due to its success as a noxious weed. *Caulerpa taxifolia* has recently become established in several estuaries in south eastern Australia, especially at Lake Conjola. It breeds faster than an outback rabbit and spreads from small fragments that are broken off the parent plant by storms, currents, boat propellers, or anchors. Locals estimated 80 per cent of the lake floor was covered just a few years ago. "Killer weed" loves lagoons that have a salinity close to that of the open sea, it rapidly dies if the lagoon is closed for long. In 2012 the seaweed vanished almost completely. According to scientists, "management of the alga may be improved if the lake was allowed to undergo its normal cycles of opening and closing to the ocean, and that entrance manipulation may be one factor that has influenced the success of this invasive species".

But once gone we quickly forgot about the killer weed and the benefit of the regular closing of Lake Conjola. The focus was all on the fish and there was a chorus of demands for dredging. Council environmental health officer Andrew Gibbes said while the recent fish kill was unusual, there was nothing to suggest there was anything wrong with the water's quality. Another officer commented, "At this stage, everything's indicating just a natural phenomenon and there's no danger to public health or environmental health." The blogs quickly implied a conspiracy, every punter knew better than the scientists.

But the council had already been busy lobbying for dredging money, and suddenly the NSW government seemed to come up with cash for works at Lake Conjola, Currumbene Creek in Jervis Bay and at Sussex Inlet. Work started within a week. Ironically, while the works were underway, high rainfall saw the lake top 1.2 metres depth, enough to have opened it naturally anyway.

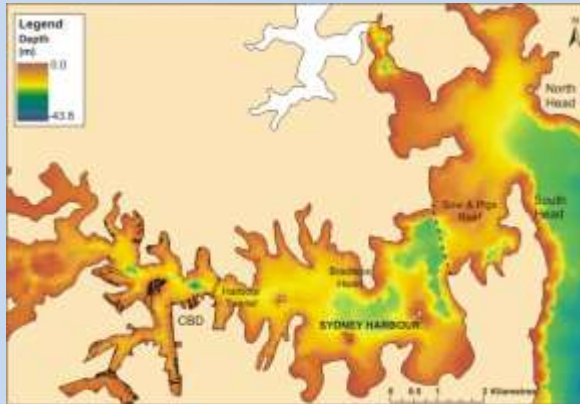
Lake Conjola and Districts Lakecare members said the entrance needed to be opened to save the stingrays and also implied it would "fix" the algal blooms. According to Dr West's scientific study (made prior to the current works), "It is somewhat ironic that a managerial strategy used to enhance the health of the lake is potentially sustaining one of its greatest threats".





## Sydney Harbour – Tainted wilderness

**Australia's most well-known estuarine system, is renowned for its complex system of inlets formed by the drowning of a river valley. It has also been drowned in pollution and is slowly recovering from an industrial legacy.**



The Harbour formed during sea level rise approximately 10,000 years ago.

The estuary, which has a complex shoreline and topography, is approximately 30 km long, with a surface area of about 50 km<sup>2</sup> and a total catchment of 500 km<sup>2</sup>. The Parramatta River, Lane Cove and Middle

Harbour are major tributaries joining the main estuary channel. In the early days of the colony of New South Wales, the area was sometimes known as Long Cove, presumably for its long narrow shape. The entrance is approximately 3 km wide with a depth of up to 30 m. Then the estuary opens up to form Port Jackson.

Before 1788 Sydney was culturally divided between the inland *paiendra* 'tomahawk people' and the harbour side *katungal* 'sea people'. The *katungal* people called themselves *Eora*.

The harbour had an important role in providing food for Aboriginal people and the new settlers, it was also the major transport route. By the second half of the twentieth century there was extensive recreational use of the harbour such as boating and picnicking. At one time there were more than 20 swimming baths along the Parramatta River. As the use of motor vehicles increased, the use of the waterways as a form of transport declined.

### Altered banks

Over time much of the vegetation along urbanised areas was removed, some banks were lined, streams concreted over, marshes reclaimed,

and mangroves removed. Sewage poured into the river, carcasses were left to rot, and garbage was dumped along the shore.

This estuary is now one of the most modified estuaries in the world, 90% of the catchment is urbanized or industrialized. It is home to a growing urban centre of 4 million people, and more than 50% of the foreshore has been concreted or otherwise armoured. Sydney's population will grow from 4.5 million to 7 million during the next 45 years.

### Heavy Metals

Waterways still bear the scars of decades of dumped toxic waste before regulations in the 1970s banned the practice. Some areas are badly affected by heavy metal contaminants. The main contaminated areas of the Parramatta River are Homebush Bay, Iron Cove and Breakfast Point.

Areas where the water is very shallow or stagnant can experience a build-up of contaminants and algal blooms. At night, when the algae don't photosynthesise, they take up oxygen supplies needed by fish, making their survival much harder. Stagnant water can contain toxic algae, which is easily eaten by marine animals, including shellfish. In this way, contaminants can work their way up the food chain.

Iron Cove Creek (Dobroyd Canal) suffers from organic and hydrocarbon pollutants. In particular, very high levels of copper, zinc, and lead have been detected in the bay. Some of this pollution is contained in road dust, which is washed into the bay in stormwater.

Dioxins are a group of persistent environmental pollutants that accumulate in the food chain. The dioxin contamination of Sydney Harbour comes largely from the Union Carbide site at Rhodes adjacent to Homebush Bay. From 1928 until its closure in 1986, the site was used for the

manufacture of a wide range of highly toxic chemicals, including timber preservatives, pesticides and plastics. From 1949 until 1976, the site



was used to manufacture particularly dangerous herbicides. The soil and groundwater on the site were highly contaminated. In the 1970s, site management was improved to comply with new environmental laws.

Dioxins from the site have spread throughout the sediments at the bottom of Sydney Harbour. It is impracticable to remediate the extensive area of the harbour that is contaminated.

### ***Fishing Bans***

Fishing bans have been in place around Homebush Bay since 1989, and were extended to parts of the Parramatta River in 1990.

The extent of contamination from the site was not recognised until 2006, when all commercial fishing was banned in Sydney Harbour after tests revealed elevated levels of dioxin in fish and crustaceans in the harbour.

Recreational fishing in the Harbour has not been banned but, based on advice from an expert panel, the NSW government recommends that:

- No fish or crustaceans caught west of the Sydney Harbour Bridge should be eaten.
- For fish caught east of the Sydney Harbour Bridge, generally no more than 150 grams per month should be consumed, except for species for which specific higher consumption limits have been established (for example, 1,200 grams of sand whiting).

A NSW government study suggested that much of Sydney Harbour will remain contaminated by dioxins at levels that will make eating fish from much of the harbour unsafe for decades [I'd suggest forever]. In context, the report reminded people that Sydney Harbour is only as contaminated as most other harbours in industrialised cities.

### ***Marine wilderness***

Despite this pollution Sydney Harbour hosts a diversity of marine habitats and marine species. Twice the number of fish species have been recorded from Sydney Harbour (550) than for the entire coast of the United Kingdom (200).

Powerful flushing events keep the system working. After a large storm, millions of litres of stormwater flow into the harbour and form a freshwater layer above the saltwater. This creates a turbid plume up to

two metres deep that flows down the harbour. As the rain stops and the plume slows, it starts to break down and mix with the salt water.

Although the plume has temporary negative effects on marine species, the movement of this stormwater into the lower reaches of the harbour dilutes the pollutants to a safe level.

Harbour waters then exchange relatively quickly with the open ocean. Water entering from the ocean travels along the sea floor because of its cold temperature, dense consistency and high salt level. Once it has gone past the heads, the force of the ocean dilutes the contaminants to undetectable amounts.

Good water exchange with the ocean means that the harbour can be cleansed of pollutants and organisms can easily move in and reproduce.

### ***Important wetlands***

Major wetlands include Bicentennial Park Wetlands and Newington Wetlands There are significant stands of mangroves along the river west of Henley (on the river's northern shore) and Mortlake (on the river's southern shore) and in the Lane Cove River. The mangroves have actually colonised areas that were previously salt marsh. Research into historical drawings and writings indicates that the mangroves were far fewer at English colonisation. Council information panels in Glades Bay explain that the bay's now extensive mangrove stands would once have been open water, sandy beaches and outcrops of rock. Land clearing and development has allowed soil and various nutrients to be washed into the river. This has provided an ideal environment for mangroves to colonise. The excessive siltation of the river is an ongoing problem.

Sounds grim? Given the size of the population around Sydney Harbour, it is a relatively clean system. It has a vibrant collection of marine life in the oceanic parts of the harbour, and plenty of things to see and do.

## Port Jackson sharks

**The Port Jackson shark is a nocturnal, bottom dwelling shark that is found in the temperate waters off of the southern half of Australia.**

One of the more well-known species observed in Sydney harbour is the Port Jackson shark (*Heterodontus portusjacksoni*).



During the day they are found in flat areas with some shelter from currents (i.e. caves). Records indicate the largest Port Jackson shark was 65 inches (165cm) in total length. However, it is uncommon for Port Jackson sharks to grow more than 53.9 inches (137cm) in total length. Reportedly, Port Jackson sharks can live more than 30 years. Port Jackson

sharks are found both close to shore and off the shelf in waters as deep as 275m.

This species feeds primarily on echinoderms, crustaceans, molluscs, and some small fish. Sea urchins and large gastropod molluscs (sea snails) are noted in almost every study on the diets of Port Jackson sharks. This shark has a small mouth containing small, molar-like teeth in the rear of the mouth used to crush prey.

Not much is known about predators of Port Jackson sharks. Juveniles are more likely to become prey for other marine life, than the adults. There are some reports indicating adult male Port Jackson sharks prey upon Port Jackson shark egg capsules, however some speculate that those reports were cases of mistaken identity with crested horn sharks. There are some speculations that Port Jackson sharks could fall prey to larger sharks, such as the white shark or bluntnose sevengill shark. The Port



Jackson shark is not used for food by humans, and is rarely targeted in fishing. This shark is caught as bycatch.

Recent studies suggest Port Jackson shark populations suffer from high embryonic mortality rates, and thus should be monitored closely to insure the populations are not being overfished as bycatch. The fact that Port Jackson sharks reach maturity later in life, along with the limited number of eggs produced each year, and high embryonic mortality rates could all contribute to a decrease in the population.

The Port Jackson shark is currently listed as "Lower Risk/Least Concern" on the World Conservation Union (IUCN) Red List.

## Crested Hornshark



**This lookalike ratbag egg robber is still cute.**

The Crested Hornshark resembles the Port Jackson Shark, which has a harness-like pattern on the sides of the body and lower ridges above the eyes. It is found in NSW from shallow inshore waters, down to depths of

around 90 m, feeding off echinoderms, crustaceans, molluscs and small fish. They have been seen several times eating Port Jackson shark egg cases.

## Autumn is Orgy Season in NSW

**Every year Port Jackson sharks arrive from their southern Australian feeding grounds to mate and lay their eggs.**



Port Jacksons are not permanent residents of Sydney Harbour. The sharks migrate from as far south as Tasmania to lay their eggs at specific sites.

Sexual maturity for females occurs between 11 and 14 years old. Males reach maturity from 8-10 years old. Late winter/early spring is Port

Jackson mating season and that's when these sharks aggregate.

The Port Jackson shark breeding season lasts from late August to mid November, during which time a female will lay a pair of eggs every 10-14 days. Scientists have noted that a female can lay up to 16 eggs during each breeding season. Males reach peak sperm production around May, but females do not begin laying eggs until late August. Mating occurs some time prior to laying the eggs and the females store the sperm within their shell glands until ready to fertilize the eggs. Port Jackson sharks are oviparous, meaning they lay egg capsules instead of giving live birth.

An embryo develops for 10-11 months before hatching from its egg capsule completely. A typical Port Jackson shark hatchling is 180-220mm long. Recent studies have suggested that egg capsules suffer 89.1% mortality, primarily from predation.

What is remarkable is that Port Jacksons sharks use the same resting sites and places where they lay their eggs every year. Following tagged sharks scientists suggested that Port Jacksons form 'visual cognitive maps' along their migratory route which allows them to find back to their 'most favourite' locations. They even pass on their knowledge to the next generation so most of these resting sites have been used for many years. At some sites Port Jacksons have been reported for more than 30 years. Depending on the season, Port Jackson sharks migrate between feeding and egg-laying sites. Port Jackson sharks may intimately know and recognise between 400-2400 individual resting sites along the southeast coast.

In Sydney Harbour, the researchers found four resting areas at South Bondi to which the sharks regularly return. When disturbed, move directly from one site to another. If transferred by boat to different localities within the harbour, up to 3 km away, they return to their original resting sites.

Particular sharks were hanging out in a non-random fashion. They were choosing to be with particular individuals, as if they have their own group of friends. There is some evidence that suggests that Port Jackson sharks are in groups segregated by gender and level of maturity. If you remove those key individuals, the population could potentially fall apart.

They are common near fishing jetties where they have a reputation as bait robbers, often leading to occasional and senseless killing of PJs by anglers.

### Pipsqueak Predator

**"Generally, Port Jackson sharks are considered to be harmless". Not so!**

According to the International Shark Attack File, "there are no confirmed attacks by Port Jackson sharks". In 2011, diver Andrew Houston went for a dip in Port Phillip Bay. He felt something latch onto his leg. "It felt like the real thing, like a big one, you know?" But when he whirled around in the water he was confronted with a pint-sized Port Jackson shark that wasn't letting go. He was forced to swim to shore with the animal still attached to him.



When he reached Elwood beach the diver and a passerby took several more minutes to dislodge the animal from his calf. The shark swam back out into the bay. All the shark attack victim had to show from his close encounter was a bruised calf and a torn wetsuit. The incident didn't deter him from diving.

*[In a tragic postscript to this funny story, we regretfully have to report that Andrew died in a diving accident in May 2013].*

## Tassie News



### Managing Devastating Urchin Barrens

Primary Source; *Rebuilding Ecosystem Resilience: Assessment of management options to minimise formation of 'barrens' habitat by the long-spined sea urchin (Centrostephanus rodgersii) in Tasmania, Johnson, Ling, Sanderson, et al.*

#### **An ambitious urchin barren research project at Elephant Rock on the East Coast of Tasmania has ended, with surprises for everyone.**



Try to imagine that you are walking along through the bush at say Mt Buffalo, the Blue Mountains, or Lamington, listening to a radio shock jock tell you that climate change is all bulldust. Then you repeat the same walk a couple of years later, except this time there are no trees. Your favourite wilderness spot has basically become an open desert dotted with patches of sick-looking

scrub. This is what has already happened to large sections of Tasmania's East Coast sub-tidal reef.

Its position on the southern end of the Eastern Australian Current means that Eastern Tasmania has been experiencing abnormally large changes in sea temperature since the 1950's. Loss of nearly all giant kelp in recent decades has been followed by the appearance of large populations of NSW black urchins (*Centrostephanus rodgersii*). As waters have warmed the urchins have extended their range into Tasmania in vast numbers. Inshore reef in places like St Helens have been destroyed and replaced by desolate urchin barrens. It is a disaster for environmentalists and fishermen.

What do we do? Well for a start we need to learn more about the phenomenon. Earlier research had identified rising sea temperatures and declining stocks of large lobsters as the main causes of the

problem. Ideas to fix it ranged from smashing urchins by hand, commercial harvesting for seafood, to introducing maximum lobster size limits. The project was trying to see if these were cost effective options to minimise the impact of *C. rodgersii*.

Abalone divers offered to hand clear urchins from their favourite fishing spots. Fishermen caught large numbers of huge lobster for transplanting at Elephant Rock in St Helens, where a 'no fishing' zone was declared. A new business in St Helens also offered to trial export shipments of urchin roe to Asia.



The answer is that there are no easy fixes.

#### **Direct culling by divers**

The project did a lot of background work into the biology of the offending urchin. Sea urchins show a high fidelity to their particular barrens patch and don't move

between barren patches very much. They moved less than 1 metre in three months. They blunder around at night looking for food but can't 'smell' weed, so they aren't attracted to nearby healthy reef areas. *C. rodgersii* is a homebody, and has a strong tendency to return to its home crevice at the end of each night.

Theoretically, divers can limit *C. rodgersii* densities in small areas at "incipient" stages when barrens occur as small patches in the seaweed bed. Localised culling is likely to be effective in reducing risk of further patches forming. However, the problem is so big that it's already too late for that to 'fix' the problem.

Abalone divers clearing localised patches had some success when they had the time to focus on detailed clearing of an area. However, the number of patches they are able to visit while fishing through an area was small, so the overall effect of their culling activity was not detectable. It only helped in a few very tiny patches. Paying people just to smash or remove urchins whether as part of another fishing activity, or as a control measure, would be very costly and would have only a localised impact.

### **Translocation of large rock lobsters**

Translocation of large predatory capable lobsters (>140 mm long in the carapace) to the reserves demonstrated that large lobsters live happily on extensive barrens. Barrens habitat will support large populations of large lobsters. Wait, there is bad news, small lobsters can't find food that's small enough for them to eat and they don't survive (raising the obvious question, how do the crays get big in the first place unless they are physically translocated from elsewhere).

The large predatory lobsters eat large amounts of native and black urchins. They reduced populations of *C. rodgersii* and the native sea urchin *Heliocidaris erythrogramma* at the reserve. They ate at least 75,000 NSW black urchins and about 16,000 native urchins at Elephant



Rock and even more at another study site in North Bay, Tasman Peninsula. The big lobsters had a significant impact on small incipient barrens and they declined rapidly in size, but their greedy eating still made no impact on the really big barren areas.

### **Managing the rock lobster fishery to control urchins**

Fisheries management scientists then used a computer model to test the effect of big changes in fishing practice on the urchins, using an ecosystem model called TRITON (don't ask - statistical analysis is all Greek to me). The estimated rate of interactions between seaweed, *C. rodgersii* and rock lobsters was punched in. A model of *C. rodgersii* and crayfish population dynamics were also added to try and see how and when the reefs of Eastern Tasmania would switch to big urchin barrens.

TRITON indicated prevention is much cheaper than a cure. Reducing the fishing of rock lobsters overall is effective. It was even more effective than only stopping the fishing of big crays. The model was consistent with observations at the translocation sites.

An upper size limit together with a reduced catch was the best outcome, but at greater cost to the fishery. Using more realistic catch levels that

fishermen can live with, mitigation of urchin barrens is possible within a 20 year time frame. HOWEVER, only on the small barrens, or in the areas where weed cover is still good. Even after 2-3 decades reduced catches will have little or no effect on really big barrens.

### **The wash up**

Fisheries management practices now need to account for the pivotal ecological role of lobsters in this system. Controlling urchins by rebuilding populations of large predatory rock lobsters can keep the problem from getting worse, and rehabilitate some of the moderately damaged areas.

Largely (but not wholly) as a result of the findings, the Minister for Primary Industries and Water announced his support for a 10 year strategy to,

1. rebuild rock lobster stocks in eastern Tasmania by introducing spatial management of the rock lobster fishery in eastern Tasmania, and
2. limiting the total allowable catch of the commercial sector in eastern Tasmania.

Catch controls won't be an easy process for professional and recreational fishermen who are also dealing with signs of long-term declines in crayfish recruitment. The professionals have mortgages to pay and (based on past performance) will bend the Minister's ear to soften the cuts. Each sector, recreational or professional will usually try blame shifting and ask to get a greater share of the remaining resource.

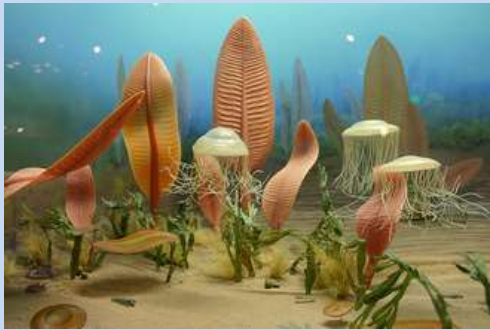
Cuts will have another long-term benefit. When the stock has rebuilt, quotas can be lifted and then fishing is also more profitable. Less fuel gets burned on fruitless trips. Small pain now for long term gain.

Before we pillory fishermen, we need to acknowledge that we have all played a part in this unfolding tragedy. It's primarily caused by our love of fossil fuels, fishing is just exacerbating it. The answer is immediate prevention rather than a later cure. Once the barrens expand and become massive, they are likely to stay marine life (and marine seafood) free deserts for a very, very long time.



## Natures Real Survivors Pt II

### Ediacaran/Protezoic Survivors (2.5-0.5 billion year old critters)



Once things like blue-green algae got going in the ocean they converted a lot of the carbon dioxide in the atmosphere into oxygen. The seas got a bit less soupy but a lot of oxygen-eating bacteria kept the seas a pretty hard place to live. Some slightly more complicated organisms did get going.

Earth's first multi-celled animals had soft bodies. This illustration shows a community of soft-bodied Ediacaran (edi-A-karan) animals. The Period takes its name from the Ediacaran Hills, S.A. It was a place where lots of fossils from this period were found. Some species resemble living ocean creatures. Others are unlike any known organisms.

However, it was a work in progress and by the end of the period not many species survived thanks to an ice age. Cooler conditions eliminated many warm water species, and glaciation lowered global sea levels.

It's hard to find any survivors from this period, but life kept going, so something must have made it. A few mineralized animal fossils, including sponge spicules and probable worm tubes, are known.

### Sea Pens

A body form that did survive was a species called *Charnia* that looked like present day sea pens. It may represent the dawn of sea pens although the current sea pen species (pennatulacean cnidarians) probably aren't really related to species from this period.



Sea pens are a diverse group with an estimated 200 or more species. They are found all over the world from polar seas to the equatorial tropics and from intertidal flats to over 6100 m in depth.

Sea pens are actually colonies of polyps. One polyp has evolved to be very large and loses its tentacles, forming the central axis. The base of this primary polyp forms a bulb which may be expanded or contracted; the sea pen uses this bulb to anchor itself.

Branching off this primary polyp are feeding polyps. Others polyps serve as intakes for water, which circulates within the colony and helps keep it upright.

The feather-like appearance of these species gives the sea pens their common name; they look something like old-fashioned quill pens. Most species do not have polyp leaves, and look more like clubs, umbrellas, or pinwheels.

Generally, sea pens don't like being dug up by swell, so they are rare in depths less than 10M and aren't seen very often by divers. In Australia there are a couple of reliable spots to see them in shallow water.

### Sea Pen Point, Tasmania

On the north-eastern extremity of Rocky Cape in 10-15 metres, just south of Cave Bay. The southern shoreline of this point is strewn with bommies and boulders that harbour plenty of fish and colourful marine life. The point is special because of the large number of sea pens that can be found growing in the sand near the reef fringe.



### Port Stephens-Great Lakes MPA

Sea pens are regularly seen over all of the dive sites in Port Stephens. This photo was taken at Fly Point in 8metres of water.

*Photo: Leanne & David Atkinson, Port Stephens NSW*

## NT Heritage Feature Channel Island



***In a remote little branch of Darwin Harbour, there is one of those little islands that looks overdeveloped and uninspiring. However, it is actually a place we love at marine life HQ, small and inconspicuous but with a rich human and natural history.***

For many thousands of years the Larrakia traditional owners have used Channel Island as an occasional hunting and camping place. Even when I visited the island recently, a group of Larrakia were fishing there, only now with the addition of a Landcruiser and solar panels for the telly.

Europeans didn't take much interest in this small mangrove studded island until it was chosen for a Commonwealth quarantine station in 1914. Vessels entering the harbour would stop near the island to offload passengers until they were cleared as disease free.

Leprosy (Hansen's disease) was first found among Chinese settlers to the Northern Territory in 1882. By 1884 the first cases among Aboriginal people were identified. Chinese immigrants with the disease were confined on Mud Island in the middle of Darwin Harbour, but for many years, no-one did anything to help Aboriginal sufferers. In the late 1931 the Northern Territory administration decided to confine and isolate everyone who had contracted the disease. The Channel Island site was thought to be ideal for discouraging escapes.

At first the Channel Island institution was staffed by state employees, then by the Catholic church. Buildings were makeshift, fresh water and food scarce, and sufferers got almost no treatment. It



was a dumping ground for 443 leprosy sufferers. At least 142 died and were buried on the island. Most buildings were salvaged for removal to Bathurst Island on the depot's closure in 1955. Only the jetty, foundations of the original quarantine hospital, and burial sites can be found in the rarely visited nature reserve.

Today, Channel Island Power Station occupies the southern half of the island and the northern half is a conservation reserve. You can drive to the island and many people visit it to use the local boat ramp. Many people also work in the power station, gas plant or aquaculture farm without being aware of the island's unique features.

### Unique Wreck



The wreck of the S.S. "Ellengowan", located NE of Channel Island is the oldest known shipwreck in Darwin Harbour. After a rich history as a luxury steam launch and coastal trader, the

unseaworthy vessel was used as a hulk for Chinese quarantine passengers. Being in such poor condition, the *Ellengowan* sank at its mooring off Channel Island in 14 metres of dark water, unmanned, during the night of 27 April 1888. It is now a protected historic wreck.

### Unique Reefs

On low spring tides, the extensive reef and mudbanks off the north-western end of the island and the reef under the bridge on the eastern side of the island dry for a few hours. It has become a favourite spot for scientific study. The site has proven to be very special.

The Channel Island Reefs are a strangely diverse coral community of 28 species despite the wet season outflows, poor visibility and blanket of fine muds in the area. The shallow reefs are 5M deep at high water and cover around 270 hectares. Visibility in the area is poor, between 1 to 3 metres during neap tides.

## Heritage – Early Colonial Sailing Vessels

### Wrecked East Indiamen - Where is the "Hebe"?



***I have an idea of presenting a few lesser known colonial sailing ship wrecks each month, but in the context of their historical period, so you might get a clearer idea about their significance. We will start off with the very early British sailing ships of the East India Company.***

You may have heard of the "Sydney Cove" or "Supply", important ships lost on a supply voyage to the fledgling Australian colonies. The role of these early trade ships in our colonial history makes them historically important wrecks. The "Hebe" is another of these wrecks. She is in a well-known spot that's easy to search, but no-one has every found her.

#### The Wrecking

Pretty much all we know about the wreck of the ship "Hebe" is from a surviving letter,

Extract of a Letter to Lieutenant Governor PATERSON, 1808.

*"The loss of the Ship I can only attribute to the reef on which she struck being entirely unknown me, or any person on board... The reef on which the Hebe struck and was the occasion of her loss (which I beg to name after her,) ... I think the Hebe went over the middle of it. It is very dangerous, never being dry though at low water, spring tides the water*



*is discoloured over it. The Hebe was on it at the top of high water drawing 13 feet, and had no less than 2½ fathoms, the swell being rather high; it has no connection with the Western Reef...signed JOSEPH LEIGH, Master of the late Ship Hebe."*

The account was a little self-serving. The reef dries at low water and in a heavy swell, breakers would have been visible. The discoloured water is kelp on the reeftop, although the reef is occasionally affected by outflows from the Tamar River.

The newly named reef was to become a shipping menace, her victims include the *Asterope* in 1883, the *SS Esk* in 1886, the *Eden Holme* in 1907 and, most recently, the ore transport ship the *Iron Baron* in 1995.

#### Background History

By the 18th century, the English East India Company (EIC) had factories and forts across South Asia and held a monopoly over the lucrative maritime trade between Britain and the East.

The "Hebe" was one of their smaller vessels, used mostly for the milder conditions of the Asian shipping routes. Some sources say she was built in Chittagong India in 1804, "a most complete and well-constructed vessel burthen about 300 tons built by Mr Breen". She was named after the Greek goddess of youth and cup bearer to the Gods. It was a popular ship's name with Lloyds Register for 1807 showing 14 vessels of the same name, somewhat complicating any research into her voyages.

The name may also have had a local connection. The young wife of the judge of the Supreme Court in Calcutta, Frances Wilton, was "exquisitely beautiful". She had stood as the model for the statue of Hebe at the Royal Academy. I suspect the "Hebe" had a figurehead looking remarkably like the 'hottest' girl in Calcutta.

As an East India Company vessel she was most probably built of teak and her intended captain would have stood by at the shipyard to ensure that she was well built. The builders of the Indiamen used a kettle-bottomed, copper fastened model to carry large cargoes. They were slow but stately-looking ships that were usually well cared for. Safety and comfort were the watchwords, with no desire or effort for speed.

The ships were built, rigged, equipped, armed, manned, and handled like the frigates of the Royal Navy. She may well have had more than 4-6 cannon. The crews were drilled at the guns and with cutlass, musket, boarding-pikes, and other small arms. Courts-martial were held on board and the rawhide cat-o'-nine-tails was freely used. Cleanliness and scripture were strictly enforced.



These vessels carried large British crews, whose work was relatively easy and who were well looked after and provided for. They had plenty of the best food and 'quite as much rum as was good for them'.

Not all the crew were well looked after. Poorly treated were the lascar crew, slung in hammocks below decks. The East India Company first employed Asian seamen known as *Lascars*, in the 17th century to fill spots left by dead and deserted European crewmen. The term is believed to derive from the Persian *lashkar*, meaning an army, a camp or a band of followers.

The articles for the East Indiaman, *Tryal*, in 1746 recorded that the Lascar crew would be paid a fixed monthly wage for a voyage from India to London. When in London, they were to get bounty money and maintenance while waiting for a return passage. They were



instead just abandoned and left destitute.

Captains were entitled to fifty-six and one half tons of space on board the ships commanded by them, which they might use at their discretion to carry cargo for their own profit. Captains were also permitted to own the dunnage (packing material) used for the protection of homeward cargoes. In European ships this would only be rough timber planks, but the crafty captains overloaded the ships with dunnage of saleable goods like cloth. These would be sold at very high prices in London. It was estimated that an East Indiaman's

captain received in wages and dodgy dealings from £6000 to £10,000 per annum. That was a small fortune at the time. The ships officers could afford to be decked out in a splendid company uniform.

Captain Leigh appears to have been a lesser country gentleman, a younger son with no right to inherit land. He was keen to make his fortune in a risky posting that could be lucrative, but an India posting could also be a death sentence. Many died young due to war or disease. He was likely to have been the same Leigh previously recorded as the Captain of the "Georgiana". If this was the case, he was an experienced captain who had already survived a few scrapes, including escaping from a French warship after a long chase at sea.

The East India Company had a monopoly over trade in the Eastern parts of the Empire including Australia, but the Australian monopoly wasn't of much of the benefit. The colonies were small and often starving. They had nothing much to trade and little coinage to pay for goods. In 1797, the company loaded a rotten old tub, the "Sydney Cove", with grog and tried to make a quick buck, but that enterprise failed when the leaking ship had to be run ashore in the Bass Strait Islands. The "Hebe" was another attempt to run a cargo of grog and luxury goods, this time with a newer ship.

The salvage auction held later in Sydney included cloth and hardware items. The rigging was also for sale. Cloth is often damaged by water in a wrecking. This suggests that sections of the ship sat mostly high and dry while the cargo was salvaged. Alternatively, the captain may have been in quite a hurry to save his cloth dunnage, and perhaps less worried about the rest of the company's cargo.

Captain Leigh went back to Sydney and continued in the Indian service. He was married in 1813 and went on to have 4 daughters, one of whom emigrated to Australia. He died in India in 1822.

### Looking for the Hebe

In the 1970s and 1980s divers often visited the reef and swam around looking for the Hebe's remains without success.

Auction reports make no mention of the recovery of the large iron objects that would make the wreck easy to find, like the more than three large anchors she likely carried as well as probably 4-6 cannon. However, the Port Dalrymple settlement was starving and short of everything. They would have made strenuous efforts to salvage as much as possible from the wreck, even perhaps the iron fittings right down to the bolts and nails.

The master mentioned a high swell at the time of the wrecking. A lascar (Indian sailor) was drowned. The sailor may have been drowned in the wrecking, or during later salvage efforts as the weather deteriorated. After an extended period of heavy weather she would have broken up pretty quickly and any relics are likely to be very scattered on this exposed and shallow reef. As her teak timbers are highly shipworm resistant, any buried timbers washed off the reef and into a sandy gutter somewhere will survive well.

She has either been completely dispersed after heavy salvage, or her remains are masked by the scattered timbers of other wrecks. The broken remains of the later "Asterope" also sit on the high point in the reef. Get looking guys and gals.

## The Oldest East Indiaman – Wreck of the Trial



***The Trial is the oldest known shipwreck in Australia***

*Primary Source WA Maritime Museum*

The British East India Company did lose one other vessel in Australia, a larger

ship of approximately 500 tons, the "Trial". While under the command of John Brooke she departed Plymouth on her maiden voyage to Batavia. She was trialing a new sailing route discovered by the Dutch, the Brouwer route. This allowed ships to catch the stronger winds in southern latitudes before turning north off the coast of Australia. As they couldn't accurately calculate longitude it was important not to overdo it and run into the Australian coast.

So, as you might expect whenever you give someone very clear instructions NOT to do something, the ship sailed too long on an easterly heading. On the night of 25 May 1622 the Trial hit rocks off the NW Western Australian Coast. 93 sailors were lost and one died on the voyage back to Batavia in the ship's boats. The captain later decided to redraw the chart and make the rocks appear a bit further west than they were. It didn't protect him from accusations of negligence. Capt Brooke bluffed his way through this mess up, but ended up in prison after losing another ship in 1625.

In 1969 the wreck was located by the Underwater Explorer's Club. Six cannon, and up to eight anchors can still be seen. The Museum's display in the Shipwreck Galleries at Fremantle house a small number recovered items including a large iron cannon.

## “Consternation and terror became general”

### Colonial traders - The Rotten Old “Hope” and her Treasure



#### ***Is there still treasure in the Tasmanian dunes or is it all legend?***

The *Hope* was a two decked sailing ship built in Bristol in 1793 constructed of English oak. She was about the same size as Captain Cook's barque *Endeavour*, though of a very different shape.

In 1820 Peter Degraives, and his brother-in-law, Hugh Macintosh, purchased the 231 ton barque *Hope* from the shipping group Hooper & Co for the bargain price of £850. Her copper sheathing was worn through in many places

and her hull was riddled with teredo worm. She had a rotten keel and weak timbers in her hull.

They filled her with equipment bought on credit, and basically skipped town. Degraives hid his share in the vessel from creditors by saying she was built at Venice and owned by a Mr. Askew of London. This deception helped him keep enough capital to start up the Cascades Brewery when he arrived in Hobart.

The *Hope* should have been pulled ashore and burned, but the colonies were short of vessels and she continued carrying whale oil, whale bone and seal skins as well as timber and other agricultural produce from Hobart back to England. On the return route she carried migrants as well as much needed coin and merchandise, stopping along the way to

trade for sugar or tea. A veiled reference in the newspapers suggests the crew were constantly manning the pumps and making running repairs. She was expensive to keep afloat but prices for imported goods were high.

In April 1827, she was on a voyage from Sydney and had picked up the pilot, Mr Mansfield, off Cape Raoul. The night was dark and rainy with light winds but a heavy swell. The barque was virtually becalmed and was being towed in by two of the ship's boats. The Pilot told Captain Cunningham, that he could safely bring her up the river, without the assistance of the boats. The captain gladly went to bed after spending two nights on deck, and left the rest to the pilot.

At this time there was no lighthouse on the Iron Pot and the pilot misjudged the entrance to the Derwent. The lead-line was thrown and the sailor called only seven feet of water, while the barque's draught was fifteen feet. Moments later she struck on what is now known as Hope Beach. One might ordinarily be suspicious about an insurance job but it doesn't seem so from the circumstances.

*"The Captain was raving at the Pilot like a man distracted, the latter standing in mute dismay – females just left their beds – the sailors not knowing which way to turn, to relieve the creaking vessel, which was expected to go to pieces every moment, as she already leaked like a sieve – the heavy surf rolling over her, adding horror to the scene – while the dismal half-hour guns of distress seemed to sound the death-knell of all on board".*

It took about 6 hours of signals before they were heard by two whaleboats from Lucas and Kelly's bay whaling station, which had been hunting off Bruny Island. They rowed over to lay out the anchors but a boat was stove in and the salvage attempt failed. The passengers were rescued and taken to Hobart in a whaleboat.



The vessel kept rolling alarmingly, and a small sloop appeared. Goods were thrown from the wreck into the boat. The crew manned the pumps but every moment were in danger of being washed overboard.

About midnight on the

following day, the rudder gave way, and the upper part of her stern was driven in. Over the next two days her main-mast was cut away, but she gradually veered round broadside to the waves and leaned over, pointing out from the land. Every wave washed up the deck as far as the hatches and all hopes of saving her were given up.

The ship Hope had on board, 1200 gallons of Sydney rum, wine, sugar, saltpetre, nutmeg, 4 casks of earthenware, tea, cheese, lead shot, pepper, beeswax, 4000 feet of cedar and 1 whale boat. Rescue craft salvaged much of the cargo. A fortnight later high winds "drove the remains of the wreck of the Hope out to sea in innumerable pieces". A sloop was still bringing up items from the wreck a month after she went ashore.

An unsubstantiated rumour exists that £30,000 in silver coin was being brought to Hobart by the "Hope" as pay for the garrison. Apparently it was stolen and hidden by two guards. The newspaper did report that Ensigns Bulkeley and Lewis of the 40th Regiment were onboard. The story says that not long afterwards the soldiers were sent to India; one died there and the other was subsequently returned to England. These two men were suspected of having taken the money. Other stories say the money was buried in the sand dunes and still lies there. There appears to be no real basis for these stories. Even the amount seems excessive pay for that time period.

More likely, the coin story is a reference to the Macintosh and Degraeves silver shilling, which was minted in the Boulton Mint at Soho. Macintosh and Degraeves hit upon the scheme of making the tokens due to the chronic shortage of specie in Sydney and Hobart. Up to 2000 may have been produced. The fate of these coins is not known, nor is it known if

there were any in the wreck at the time, or whether or not they were recovered. Only about 50 have survived to the present day and all of these are in very fine condition, indicating that they were probably never put into circulation. The tokens are likely to have been well-known in Hobart, as was the Macintosh and Degraeves interest in the "Hope". This may have later sparked some tall stories about hoards of coins over a rum or two.

## One Unlucky Bugger

***Trying to make a living as a merchant in the early colonies was risky, even for well-to-do families.***

Captain John Laughton arrived in Australia in 1824, as the master of the ship "Alfred". He agreed to buy into a syndicate running the brig "Governor Phillips" on a sugar run to Mauritius. The voyage was a disaster and failed to return a profit. The ship was sold at a loss.

He worked as master of the little schooner "Helen" and went into the Straits to catch seals. In 1826, he got David Hoy to build the small brig "Apollo" at Bruny Island. However, the vessel was wrecked at Maria Island on her second voyage. He had goods on board to the value of £500, and the loss made him nearly penniless.

As soon as he had returned to Hobart, John saw a chance to redeem his fortunes. He bought the remains of the "Hope" which were likely to yield a profitable return from salvage. He went down in a small boat to inspect operations and drowned in the surf when the boat capsized.

His family was destitute at a time when there was no Widows pension. The merchants of Hobart clubbed together to help his family.



## The Black Swan (*Cygnus atratus*)

### **Where to find them**

The Black Swan is common in the wetlands of south western and eastern Australia and adjacent coastal islands. Black Swans can also be found occasionally on the open sea near islands or the shore. Within Australia they are nomadic, with erratic migration patterns dependent upon climatic conditions.

### **Population**

The current global population is estimated to be up to 500,000 individuals. "No threat of extinction, or significant decline in population has been identified with this numerous and widespread bird". Despite this, explorers noted vast flocks in Macquarie Harbour, the Tamar, and Herdsman's Cove in the Derwent. They are still found there, but perhaps not in the same numbers. Several thousand still nest on Moulting Lagoon, on Tasmania's East Coast.

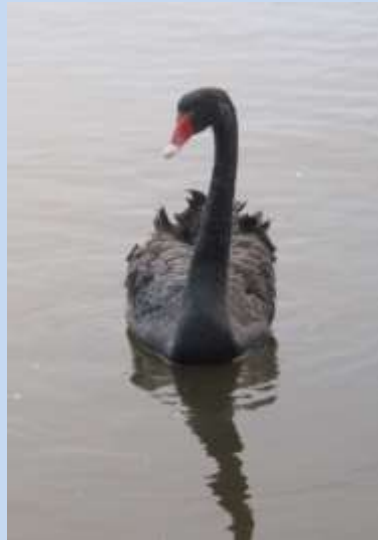
### **Hunting**

Swans have been hunted since the early days of settlement for food and later for sport. Their saving grace was that the flesh is oily and dark, so when they lost popularity as a source of food it was easier to convince hunters to adopt conservation measures. From as early as the 1860's their hunting has been regulated. The species was hunted to extinction in New Zealand, but later reintroduced.

Perversely, it was the early decimation of these game species that led to the acceptance of regimes for protected areas and controlled take regulations. Arguably marine protected areas are not a new idea, as estuaries have been reserved for more than a century under these early game preservation regimes.

### **Breeding**

Generally, Black Swans nest in the wetter winter months (February to September), occasionally in large colonies.



A Black Swan nest is essentially a large heap or mound of reeds, grasses and weeds. Both parents share the care of the nest. Like all swans Black Swans will aggressively defend their nests with their wings and beaks. After hatching, the cygnets are tended by the parents for about 9 months until fledging. Cygnets may ride on their parent's back for longer trips into deeper water.

Black Swans, like many other water fowl, lose all their flight feathers at once when they moult after breeding, and they are unable to fly for about a month. During this time they will usually settle on large, open waters for safety.

Like other swans, the Black Swan is largely monogamous, pairing for life (about 6% divorce rate). An estimated one-quarter of all pairings are homosexual, mostly between males. These 'gay' males will also steal nests, or form temporary threesomes with females to obtain eggs, driving away the female after she lays the eggs.

## Bass and Flinders Black Swan Encounters

**Early voyages were often provisioned by the shooting of large amounts of game, especially Black Swans.**

When Bass & Flinders entered the Tamar they noted,

*"Mr. Bass went off in the boat to look up [an inlet]...a number of black swans were swimming before him, and judging from former experience in Western Port, that several of them were unable to fly, he gave chase with the boat. On his return at dusk, he rejoiced us with the sight of four, and with a promise that we should not be in want of fresh provisions in this port".*

*"Many aquatic birds, both web-footed and waders, frequent the arms and coves of the river; but the black swans alone are remarkable in point of number. Mr. Bass once made a rough calculation of three hundred swimming within the space of a quarter of a mile square; and*





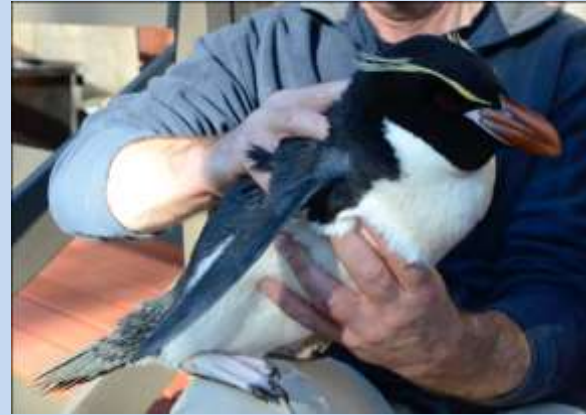
heard the 'dying song' of some scores; that song, so celebrated by the poets of former times, exactly resembled the creaking of a rusty sign on a windy day! Not more than two thirds of any of the flocks which they fell in with could fly, the rest could do no more than flap along upon the surface of the water, being either moulting, or not yet come to their full feather and growth, which they require two years to attain. They swam and flapped alternately, and went along surprisingly fast. It was sometimes a long chase, but the boat generally tired them out. When in danger, and speed makes no part of their escape, they immerse their bodies so far, that the water makes a passage between their neck and back, and in this position they would frequently turn aside a heavy load of shot. They seemed to be endowed with much sagacity; in chase they soon learned the weakest point of their pursuers, and, instead of swimming directly from them, as they did at first, always endeavoured in the most artful manner to gain the wind, which could only be prevented by anticipating their movements, and by a dexterous management of the boat.

The swan is said to feed upon fish, frogs, and water-slugs; but in the gizzards of many that at different times and in different places were examined by Mr. Bass, nothing ever appeared but small water plants, mostly a kind of broad leaved grass, and some little sand. To their affection for their young he had seen some lamentable sacrifices; but of their fierceness, at least when opposed to man, or their great strength, he had seen no instance."

They headed up the river to Egg Island and came upon "a flock of swans, in number not less than from three to five hundred; and their cast quills were so intermixed with the sand, as to form a component part of the beach. This countless number of quills gave me an insight into the cause why so many of the swans, though not young birds, were unable to fly: they moult their wing feathers, probably at stated periods, though not, I should think, every year. This sandy projection was named Swan Point. On steering southward from thence, I found that the bight in which this great number of birds had assembled, was full of shoals producing the long aquatic grass which forms the principal part, if it be not their sole food".

## Penguin visitors to Tasmania

Eric J. Woehler



Remarkably, in July two crested penguins were reported from south-east Tasmania within a few days of each other, and both were from New Zealand. The first was a Snares Penguin (*Eudyptes robustus*). This species is endemic to the Snares Islands off the coast of New Zealand. The penguin is with an animal carer

who is being advised by veterinarians and will be released when a minor injury has healed and the bird meets release criteria.

There have been a number of previous records for the species from Tasmania. The second penguin was a juvenile Fjordland Penguin (*E. pachyrhynchus*). The bird was taken to a veterinarian and released into the care of an animal carer, but died the next day from a number of contributing factors. Fjordland Penguins are regularly reported around Tasmania, with more than 40 previous records from our shores.



## 2014 Winter Gull Count

*By Dr Eric Woehler, Extract from Yellowthroat Magazine*

The 2014 BirdLife Tasmania Winter Gull Count (WGC) was held on Sunday, 8 June 2014. The counts of Kelp and Pacific Gulls was begun in 1980 by members of BOAT (Bird Observers' Association of Tasmania, later Birds Tasmania). As from 2013, staff from Tassal and Huon Aquaculture were involved, and they contributed significantly, with counts of gulls associated with fish farms and other infrastructure at all leases. Hobart and Glenorchy Councils allowed counters access to McRobies Gully and Glenorchy Waste Disposal Sites respectively, and Southern Waste provided access to the Copping Waste Disposal Site. Marine Life Tasmania undertook counts of gulls roosting in foreshore areas that were otherwise inaccessible to land-based counters.

### 1. Silver Gulls

Silver Gull numbers increased to more than 16,000 birds in the count area. This is the third time since counts began in 1983 that Silver Gull numbers in WGCs have exceeded 10,000 birds.

Rather than a long-term increase in Silver Gulls, the Winter Gull Count data set supports a redistribution of Silver Gulls away from their historic and 'traditional' feeding and roosting areas on foreshores and Waste Disposal Facilities to novel feeding and roosting areas. This is in response to the closure of tips and their conversion to waste transfer stations, which reduces the availability of food to gulls.

### 2. Kelp Gulls

Total Kelp Gull numbers counted exceeded 7000 individuals in the 2014 WGC, the highest count recorded since 1980. Kelp Gull numbers had previously peaked in 2003 when more than 7000 were counted, but since then the numbers recorded in south-east Tasmania have fluctuated between 3000 and 6000 birds. Counts at several sites, including fish farms, approached 1000 Kelp Gulls and the largest flock was reported at Copping, where more than 1200 gulls were present. Hobart and Glenorchy Tips supported more than 1000 Kelp Gulls, and there were more than 500 recorded from Marion Bay and Porpoise Hole.

### 3. Pacific Gulls

The 2013 WGC recorded the highest number of Pacific Gulls since counts began. The 2014 count was lower, with fewer than 600 Pacific

Gulls recorded; this was the second-highest count since 1980. Pacific Gull numbers have fluctuated between 200 and 400, so the recent counts may indicate an increase in the species. Pacific Gulls were observed throughout the count area, but many observers commented that numbers were lower or nil at their count areas. Whether this reflects a change in flock size and/or a redistribution of Pacific Gulls will require further analyses and further data.

### Discussion

The increased survey effort that was made for the 2014nWGC matched that made for the 2013 WGC. The 2013 WGC saw all aquaculture leases in south-east Tasmania included in the count for the first time. This was necessitated by the long-term changes in the behaviours of all three species of gulls, reflecting real and sustained changes in their roosting and feeding areas.

The closure of metropolitan tips and their conversion to waste transfer stations has seen decreased food availability for gulls in south-east Tasmania at these sites, and the gulls have responded by attending fish farms as alternative feeding and roosting sites.

The long-term (i.e. decadal-scale) trends in the data are clear, and the data and our analyses' results are consistent with other data sets and current studies. Kelp Gull numbers continue to increase, while the Silver and Pacific Gull populations show greater inter-annual variability.

## Gull Mortalities

In February this year, BirdLife Tasmania lodged a Right to Information (RTI) request with DPIPW regarding gull control measures and incidental deaths of gulls throughout the state since 2000–01. RTI requests have replaced the earlier Freedom of Information requests in Tasmania. The DPIPW response took more than 5 months and resulted in more than 600 pages released, detailing the extensive efforts to shoot and poison gulls, and to oil their eggs at colonies throughout the state. Data were also provided on gulls entangled in nets and other infrastructure associated with aquaculture. Details of what 'control' methods are being used and the numbers involved are presently being collated to provide the first Statewide synthesis of the numbers of gulls shot, oiled or poisoned in Tasmania. This synthesis will then be analysed and the results disseminated.