



MARINE *Life*

*The Crocodelicious Edition -
sink your teeth into it!*

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Marine Life magazine

Our Goal

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

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Cover Photo; Crocodile smiles (source: The Internets)

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NATIONAL News Roundup

Lost boats and cars

It seems like 2014 is going to be a year for odd boat mishaps...



Stephen Knight's LeisureCat, was at anchor during a camping trip to an island about 40 nautical miles off the Exmouth coast. A storm came up, "This was one of those super-cell storms, 40-knot winds and gusts at 60-knots,

and basically it took the boat from its mooring and it took it about three miles out. We could still see it because it had its anchor light on," It was last seen upside down in rough seas. Eight months later, authorities on a small island off Madagascar identified the boat from its markings and contacted the owner.

Meanwhile in Victoria, a Ford ute loading a jetski ended up in the ocean at Mornington after the driver reportedly got his thongs stuck under the vehicle's pedals. He managed to reverse off a jetty and plummeted into the water and the car started to float away. This was embarrassing enough, but the poor guy picked a slow news day and the story was syndicated around the country and hit all the major national news sites.



WA News

Not so tall' fishing stories

A potentially damaging culling program gets off to a slow start.

Up to 72 drum lines will be set off Perth beaches between January and April. The drum lines are baited hooks that are meant to be targeting great white, tiger and bull sharks larger than 3m. The policy was brought in after seven people were killed by shark attacks in WA waters in the last three years.



Cool! – A 1 million dollar contract to go fishing, And you are allowed to catch tiddlers

Baiting started in January. Fisheries officers dropped 36 drum lines in waters at five sites between Port and Leighton beaches, Cottesloe, City Beach, Trigg and Mullaloo. In the South West, lines were set 1 km off Old Dunsborough Beach, Meelup, and Gracetown.

The fisheries boat was dogged all the way by media boats and a small collection of protest boats, they had sniffed blood in the water and closed in for a killer photo, despite the attentions of the police. Two sharks were caught, but were too small and were released. The Government then rushed off what seems like a pre-prepared media statement, warning swimmers that tiny sharks were in the area. Assumedly residents needed to know, in case they sucked on their toes, or threatened to stampede local bait fish.

The first shark shooting came on Australia Day, off Old Dunsborough Beach, less than a day after the line was set. Another shark was caught on a drum line off Meelup Beach near Dunsborough and shot. Some sharks have taken up to four shots to the head before they die. Other smaller sharks have been reported fished up dead. Activists claim one small shark took 20 minutes to get off the hook and sank after being freed. But a spokesman for the Department of Premier and Cabinet said the released shark "swam vigorously away".

Whatever the case in this instance, it is true that all fish suffer stress when hooked, and it is inevitable that some won't survive the experience. Ministers have previously shrugged off the suggestion that smaller sharks and other small animals could be caught on the hooks saying "big hooks" catch "big sharks". All I can say to that is, 'see the above photo'.

An unofficial source revealed that 30 sharks had been caught— 10 have drowned or been shot. The state government then reversed its decision to keep number a secret and admitted that 66 sharks had been caught by 18th February, all but three were Tiger Sharks. No great whites have been caught. Seventeen of the Tiger Sharks were shot while another 9 have been recovered dead on the drum lines. By 12 March it was up to 106 sharks overall, with 30 shot. There has only been one non fatal tiger shark attack in WA waters in the past 34 years causing the Opposition Leader to remark, "So we are spending millions of dollars to catch sharks that once in 34 years may have bitten someone - can you think of a worse example of public policy than that?"

Other predators were also hanging around Meelup: the WA police were in the car park busily looking for excuses to deter protesters, impounding a boat being used by an animal activist. A police spokeswoman said the boat was seized because the people in

possession of it "could not identify the owner." The trailer was seized on the basis that it was unregistered and the affixed license plate may not be consistent with the trailer," she said.

International news coverage included CNN, the BBC and The Telegraph, while protesters ramped-up their campaign via social media. Despite 23,000 public submissions the EPA refused to assess the fishery, already deciding that it was a negligible risk to the species. An attempt to get a court injunction also failed.

W.A. is only a new kid on the block. Qld and NSW have a long-running culling program that no longer attracts the same attention. The NSW netting program is especially notorious for its bycatch of marine mammals and rays. Despite a recent fatality, S.A. has decided not to join in. Perhaps all the states need to look into whether we really need this program, and if we are willing to accept the low risk of predation to avoid environmental harm. This question needs to be asked not just in far-way Perth, but in our own backyard too.



Let's Cull Pushbikes

Look I told you, exercise is risky...

The University of WA's Professor Peter Sprivulis bought into the debate by rushing out a draft report on the statistics of shark attack. The results are a bit more emphatic than the 2012 WA fisheries report, but we stress that this latest report is yet to be peer reviewed. He stated that the number of shark attacks has increased dramatically in the last four decades, much higher than was previously thought. "Shark bite risk is highly correlated with the seasonal presence of migrating Humpback whales and varies with choice of water activity, season and location by almost three orders of magnitude." All winter/spring reported bites occurred at times when whales were migrating along that section of the coastline.

However, the risk of being attacked by a shark off Perth in summer is still just one in 30 million. Swimming off metropolitan Perth beaches in summer/autumn, if bathing less than 25m from shore in water less than 5m deep, is estimated to be 50 times safer than cycling in WA. Even if the whale numbers continue to increase, inshore swimming will still only be as dangerous as most other recreational activity in W.A.

Offshore diving and surf sports off Perth during winter/spring have a similar risk to cycling. Winter/spring offshore diving south of Perth has between 3 and 11 times the cycling risk. That's not a high risk, but it's a tangible threat of at least an encounter for frequent water users when whales are in the area. *[So does cycling underwater increase the risk or not, I'm confused]*



NT News

Residential development stirs up Ludmilla Bay

Source NITV



Planned developments at Ludmilla Bay in Darwin have alarmed the Larrakia community, who fear they will lose a popular fishing and recreational area. The proposed crocodile-shaped island would capitalise on the state's

icon which attracts tourists from around the world to Kakadu National Park. But Larrakia community members oppose any such development. "It's gone from being more-or-less attached to the land, a land-based marina, to a man-made island. I mean c'mon, it's a beautiful little natural bay," said Larrakia community member and spokesperson Donna Jackson.

The Northern Territory Environment Centre says the proposed development would damage mangrove, turtle and dolphin habitats and restrict locals from carrying out their traditional hunting methods. "It's a really important area for a lot of people so the fact that they haven't done any consultation with these people is pretty sad really," said Samantha Nowland from the Northern Territory Environment Centre.



Abbott's Point Dumping

The Great Barrier Reef Marine Park Authority (GBRMPA) has approved plans to tip about 3 million cubic metres of spoil into the Marine Park as part of the project at Bowen.

The organisation says there will be safeguards in place to ensure the reef will not be adversely affected. The conditions include limits on when the spoil can be dumped, a long-term water quality monitoring plan and compensation for commercial fishers in the event of adverse impacts.



The dump site does not contain coral or seagrass and the refuse is similar in composition to the area that's being dredged.

Mr Reichelt says the organisation was not pressured to approve the proposal and says the decision was based on relevant scientific data.

The proponent of the Abbott Point terminal, the North Queensland Bulk Ports Corporation, has welcomed today's decision, which puts it on track to develop the world's largest coal port. The Resources Council says the Marine Park Authority has based its decision on scientific evidence that shows port dredging has not resulted in permanent damage to the reef. "This could unleash investment of nearly \$30 billion, create 15,000 permanent jobs and as many jobs again in the construction phase.

Dredging can release a lot of nitrogen and phosphorous, metals, pesticides from sediments. Sediment can be difficult for sea grasses and

for coral to deal with in large doses and they can be smothered. Scientists have said that "For coral, it takes an enormous amount of energy for coral to deal with sediment. If there is too much, they will just be smothered and die". Sediment also cuts the amount of light that is available for photosynthesis.

"The fact that it [the disposal site] is in deeper water, is better in a sense than being in the shallow water in that some of the re-suspension by normal winds will be reduced. But the further we go, the further into the marine park we go, so that means your proximity is closer to corals and to the outer reefs nearby."

The dredging quantities are not great, nothing like Gladstone and its 3 kms offshore, and quite some distance from the coral cays of the reef and 70 km from the Whitsundays. In fact the closest sensitive site is a WWII Catalina aircraft wreck which is a war grave. That was originally only 3 km away and GBRMPA has "obtained some initial advice from a maritime archaeologist regarding potential further requirements for survey and monitoring work". A protest led to the 400Ha dump site being moved to a site 20 km north of the wreck in 40 metres depth.

Theoretically the spoil could be damaging. It sounds like damage to the reef is a less than likely possibility with the safeguards that have been put in place. But Greens Senator Larissa Waters says she does not believe sufficient protections are in place. "Sadly we've seen staff cuts at the Environment Department and the Marine Park Authority themselves already with more expected to come. Who's going to be watching to ensure those conditions are complied with?"

Louise Matthiesson from Greenpeace says the conditions are not good enough. "There is some silver lining that these conditions will delay the coal port developments by up to a year," she said. She says Greenpeace will continue lobbying against the port's expansion.



SA News

Seagrass revives off Kangaroo Island

Efforts are being made to restore seagrass off an idyllic and isolated part of the Kangaroo Island coast.

Data shows 1600 hectares of underwater meadows have died as a result of nutrient run-off at Western River Cove over the past 30 years. The cove is in the middle of the island's north coast. Seagrass meadows also play a vital role in carbon processing, nutrient recycling and stabilisation of the sea floor. Seagrass loss often results in an increase in wave height and intensity, and associated erosion of the foreshore.

The Coast and Marine Program has successfully trialled transplanting seagrass to help restore seagrass meadows in Western Cove. Last year's community seagrass planting day resulted in over 200 seagrass sprigs being planted and 12 months later most of them have not only survived, but are thriving.

Many residents and visitors have planted trees as part of land conservation projects. Now there's an opportunity to help the marine environment by planting seagrass.



NSW News

Bald Sydney reefs get a strand-by-strand transplant

Seaweed transplants could help revive an underwater forest wiped out by sewage.



Crayweed (*Phyllospora comosa*) once thrived off the city's shores, but the embryos of *Phyllospora* are vulnerable to pollutants found in sewage. During the 1970s and 80s, a high volume of Sydney's sewage was pumped into the water close to shore. In 2008, researchers discovered a 70 km stretch of Sydney's coastline had

become barren. During the 1990s, huge sums were spent to pump it out to sea, but the crayweed never grew back.

A group of ecologists took fertile crayweed from surrounding coastal areas and transplanted the species onto two barren reef sites off Sydney at Long Bay and Cape Banks. One site did very well, only just well enough to give hope.

Seaweeds are the "trees" of the ocean, supporting life along temperate coastlines, which can help promote biodiversity and sustain fishing and tourism industries. "This kind of restoration study has rarely been done in seaweed-dominated habitats, but our results suggest that we may be able to assist in the recovery of underwater forests on Sydney's reefs, potentially enhancing biodiversity and recreational fishing opportunities along our coastline," said research supervisor Peter Steinberg.



TASSIE News (that 'other' island)

Jelly time

It's that time of year again, when harmless jellies and salps breed up, blow inshore and terrorise the quaint inhabitants of sleepy fishing villages.

Southern beaches were awash with a jellyfish bloom in numbers and varieties not seen before. Tasmania was the epicentre of public interest with sightings getting world-wide media attention.



Reuters [*the cheeky bastards*] decided that Hobart was "a sleepy hamlet" when reporting that some kids had found a giant jellyfish washed up on a beach. About 1.5 meters (five feet) across, the white jellyfish with a pink spot in the middle was a relative of the lion's mane jelly. Reported as an "unknown" species, actually it was a known type of jelly, just not formally described, the case with just about every marine species you can't eat. It was called the "snotty" jelly, probably by the same 'sleepy hamlet' journo and the name stuck thereafter.

The jelly giant was only a tiny part of a huge jelly and salp bloom. "There's something going on that's causing a whole lot of species to bloom in staggering numbers and we don't know why yet," scientist Lisa

Gershwin said. "It's so thick with jellyfish that it's like swimming in bubble tea." That meant swimmers were soon complaining, especially about large slicks of salps (free-swimming sea squirts). "Salps don't sting but there's a high percent of fragments and small and immature species that hang out with the salps that irritate and sting", Dr Gershwin said.

Aquatic biologist Peter Davies also spotted a large jellyfish in a suburban rivulet. For a sleepy hamlet it was pretty polluted. "It doesn't



look like an estuary, it looks like a drain, but the bottom end of the rivulet is in fact still functioning as an ecosystem," he said. "This is a big, rare jellyfish for this kind of little stream." Mr Davies has worked on the rivulet ecosystem for over 20 years and this is the first

time he has seen a jellyfish in the rivulet.

"The salps are in truly unbelievable numbers," Dr Gershwin said. "I don't know what's going on, or what's creating the context for so many salps, but it highlights the need for research to answer these types of questions."

Manta ray found in Tasmanian waters



Leo Miller recently sent a picture of a manta ray he had seen off Tasmania's north-east tip to the Redmap website. University of Queensland manta ray specialist Kathy Townsend said it was Australia's southernmost sighting of the species, the next most southerly sighting had been

just south of Sydney. The species normally lives in tropical waters.

Redmap's Jemina Stuart-Smith said the manta ray sighting, along with increasingly frequent reports of other warm-water fish such as marlin and zebrafish, was consistent with a rapid warming of waters off Tasmania's east coast. The warm waters pushed south by the eastern Australian current are also seen as complicit in the environmentally disastrous invasion by the long spined sea urchin, leaving large areas of the east coast seabed permanently barren.

Dr Stuart-Smith said many of the fish reported to Redmap, including the manta ray, were most likely stray individuals that had ridden down with the warm current, but could not yet survive in Tasmanian waters year-round.

Readers were quick to note that this was not the first sighting of mantas in Tasmania. One climate change skeptic reader stated that Matthew Flinders saw one during his round trip, "proof that Tassie waters aren't warming up". Another reader saw one while skin diving off the rocks

near West Park, Burnie circa 1974. Another reader found a 1.8M manta ray carcass washed up on the beach in Southport Lagoon forty years ago.

A quick search of the digitised newspapers in Trove shows that these sightings are rare, with only one unconfirmed report in 1951. If sightings becomes frequent it would demonstrate that they are extending their range, at least in the summer. While I don't doubt the readers sightings, we also need to note that they are easily confused with eagle rays, also a usually more northerly stingray.

Manta ray sightings don't make a case for climate change on their own, they are just one indicator. You can be assured that the waters off Eastern Tasmania HAVE heated up, Maria Island in Tasmania being one of the few places in the world where we have a long series of well-kept records.

Truant Turtles



While we are at it, a leatherback turtle was hanging around the Hippolytes in January and reported to Redmap. This animal is a more regular visitor to Tasmania, although it is not commonly seen on the East Coast.

Tasmania is within the southern extent of the range of some species of turtle which are occasionally seen, especially in Bass Strait. In very hot

years, the Eastern Australian Current will also bring the odd turtle into the South East of Tasmania.

The most common species in southern waters is the Leatherback Turtle. It is regularly seen in Tasmania and Victoria in the summer months. In Bass Strait, Leatherbacks concentrate in areas where southward warm currents converge with the steep deepwater dropoff, probably they find food there. This means that King Island and Flinders Island are turtle 'hotspots'.

Unfortunately they are most often sighted tangled in fishing gear. A retired Tasmanian tuna fisher reported catching "an estimated 800 leatherback turtles in drifting gillnets over a 50 year period up to 1986". Leatherback deaths from entanglement in cray pot buoy lines may be the most significant cause of death from human related activities on the Continental Shelf. The losses aren't intentional and over 75% of the turtles caught in buoy lines are released alive. However, the annual by-catch mortality from this fishery has not been fully assessed.

While modern fishermen might not talk too much about turtle by-catch these days, it wasn't always such a big concern. However, the 'novelty' value of these old newspaper reports suggest it wasn't an everyday event in Tasmania.

April 29, 1889. *TURTLE CAPTURED Fortescue Bay. Mr Maddox and a mate had the nets down along the kelp for trumpeter, and when making a haul they found something uncommonly heavy in their graballs...which proved to be a leathery turtle. The turtle weighs upwards of 700lbs. and measures 8ft. by 6ft.*

30/5/1930: *A Truant Turtle - "An unexpected visitor at the Beaumaris Zoological Gardens at the moment is a specimen of the hawk-billed turtle...The turtle, caught by Senior-Constable" Fisher at Flinders Island, is*

normally a stranger to Tasmanian waters, and is the first on record to be taken in these parts. [The turtle refused to eat and soon died]."
4/9/1930 Marine Life Migrations

Evidence has not been lacking in recent weeks of certain changes in the marine life on the Tasmanian coast, due, it is thought, to the milder winter, arid spring weather that has prevailed. Some time ago a turtle was discovered on Flinders Island, there being only one instance on record of a turtle having previously been found in Tasmanian waters, and that was a different species to that recently caught. There also have been an unusually large number of "whip-tails" [eagle rays?] In the vicinity of the Hobart wharves; In fact, a larger number than has been known for 30 years. Other indications of unusual migrations from warmer climates have been found, and the Museum authorities are anxious to receive reports regarding them. Mr. Clive Lord (curator of the Museum), commenting on the matter yesterday, said it was probably due to an alteration in the warm current running down the east coast of Australia.

15/7/1939: TURTLE FOUND

Last week a turtle was found washed up on the beach at Wickham. It measured two feet across the back

12/3/1951: HUGE TURTLE LANDED AT KING ISLAND

A King Island fisherman found a huge sea turtle tangled in the buoy line of one of his crayfish pots on Saturday. King Island residents estimated it weighed about a ton and measured about 6ft. long by 4ft. wide. ... Fishermen killed the turtle and cut it up for crayfish bait. The turtle is the biggest King Island residents remember. A turtle caught off New Years Is- ' land several years ago was not as big.



Report your oddities to www.redmap.org.au

Dolphin dead in net



The dead dolphin was found at the Tessellated Pavement tourism spot at Eaglehawk Neck. Wildlife biologist Rachael Alderman from the Department of Environment says the dolphin was most likely caught in

fishing gear and drowned. Dr Alderman says it appears the tail was cut off to disentangle it. "There are several marks around the tail stock that are consistent with entanglement," she said. The department is warning recreational fishers to check nets regularly for by-catch. Fishers are also advised not to set nets if dolphins are seen in the area.

Critter Files

Seabats

Yes, these creatures really exist...



Some anglerfishes of the family *Ogcocephalidae* have adapted to living on the mud in the deep, lightless waters of the Atlantic, Indian Ocean and Western Pacific Ocean. The largest members of the family are about 50 centimetres in length. The lure at the front of the head is not luminous as in most other groups of anglerfishes, but secretes a fluid that may act as a chemical lure, attracting prey. Analysis of their stomach contents indicates that batfishes feed on fish, crustaceans, and worms. They are usually found standing on their fins and to swim away they kick with their back fins like they're wearing scuba flippers. They also bob their eyes up and down when excited, especially after a meal. They are mostly found at depths between 200 and 1,000 metres.



Starry seabat (*Haliutaea stellata*)

Some species live in much shallower coastal waters and even in river estuaries. Divers have encountered the red or starry seabat (*Haliutaea stellata*) in shallow water in the Sea of Japan, but they usually prefer depths between 50 – 400 m. A recent survey of the Galapagos Islands found a species with 'lipstick', called the Red-lipped Batfish *Ogcocephalus darwini*, in only 30 metres.



Red-lipped Batfish *Ogcocephalus darwini*

Seabats are also found locally with a Starry Seabat being trawled north of Townsville in 1986, at a depth of 220m.

CROctastic Feature

Fast Fact Takeaways – Salties

The focus of this edition will be another much maligned predator, one that doesn't animate our thoughts too often, as it prefers places of low population density. In tropical tidal rivers, and out at sea, it is the top predator in a way that Great Whites could only dream about.



The Estuarine (Saltwater) crocodile (*Crocodylus porosus*) is found in the warm climate from Sri Lanka and India in the west to the Caroline Islands in the east, to the north from Burma and South-East Asia, to Australia, Vanuatu and the Solomon Islands in the south. In Australia, they are restricted to northern parts of the continent, from about Rockhampton on the east coast of Queensland to Onslow on the west coast of Western Australia. Males can grow to 7 metres (23 feet) but most are less than 5 metres. Females are usually less than 4 metres in length and may begin nesting at about 12 years of age. Maximum

lifespan is unknown however it is estimated that they can live for at least 70 to 100 years.

"Salties" breed in the wet season (Nov-Mar) and build a nest consisting of a large mound of vegetation and soil. The nest is usually located in grass or fringing forest along the banks of a watercourse or freshwater swamp. About 50 eggs are laid inside the nest mound and incubation takes between 65 and 110 days. The female usually guards the nest vigorously as she hides in a nearby wallow. Pigs and goannas eat crocodile eggs and only about 25% of eggs will hatch. More than half the hatchlings die in their first year of life because young crocodiles become prey for other animals. A high proportion of juveniles are displaced from rivers by larger crocodiles and can starve. From those hatchlings that emerge, less than 1% survives to adulthood.

Smaller crocodiles appear to feed throughout the year, reducing their intake during cooler periods. Larger crocodiles are affected more by cool weather and their food intake is greatly reduced or can stop altogether. They can live for months at a time without feeding. The wet season seems to be the period when growth and feeding are maximised in crocodiles of all sizes. Young crocodiles eat small animals such as crabs, prawns, fish, frogs and insects. Larger crocodiles take bigger prey including pigs, birds, reptiles, turtles, wallabies and even other crocodiles.

Behaviour

Crocodiles spend a fair bit of their time diving under the water, foraging, resting and - when they're small - escaping predators. Since crocodiles are cold blooded animals, their body temperature and metabolic rate is affected by the temperature of the environment.

They have the ability to slow their heart rate down to one beat every thirty seconds or so. They have been observed in captivity holding their breath for up to four to six hours underwater.

Crocs can maintain strenuous activity for only short periods of time, after which they become totally exhausted. This can occur during the capture of prey, or while fighting other crocodiles. Exercise must be followed by a period of rest as they build up an oxygen debt. Larger crocodiles, over 5m, often die during capture operations if they struggle excessively. The warmer it is, the higher their metabolism and oxygen use. In summer time they need more time to recover from longer dives, or fights. They are often seen resting on the surface or basking in the sun during the day.

Crocodiles use a combination of active hunting and the more passive "sit and wait" strategy. Juveniles tend to wait until potential prey comes within striking distance. Once a large crocodile is attracted by the movement, sound and perhaps smell of potential prey, it will orient its head towards the prey, submerge (usually without a ripple), and swim underwater until it reaches the immediate vicinity of the prey. Usually on the bank, in the water at the bank, or in overhanging vegetation. They also like hanging around boat ramps where people are carelessly cleaning fish. After the strike, larger prey is squeezed tightly until all movement stops. The largest prey evokes the full attack sequence with rolling to throw the prey off balance so it can be dragged into deeper water and drowned. Because the stomach of the crocodile is small, head shaking, thrashing and rolling is used to dismember large prey into smaller pieces.

They have a great memory for food and will identify and set up ambushes in spots where prey often visits. They can lie in wait for days. Never revisit the same spot in a river to collect water, and don't linger.

Movements

Salt-water Crocodile hatchlings remain near the nest for up to two months although they can disperse up to 9 km in their first month, with movements over 20 km recorded within six months. Within one year, over 90% of surviving crocodiles are within 5 km of their nest site. Crocodiles between 2 and 6 years of age may travel up to 80 km from their nest site.

A study in the Wenlock River showed that adult crocs tend to roam up and down one home river system most of the time. The majority of males stay in a routine home range and defend it, but some 'nomadic batchelors' move long distances around a river system, especially at night. These batchelors average 380 metres of travel each night and 230 metres during the day. Over a six month period they can disperse over 100 kilometres from their original stretch of river. Some of these nomadic males will occasionally try and move to places where there is less competition. A high majority (>75%) of crocs captured in relocation traps are males between 2 and 3 m total length. The movements of relocated animals demonstrate their ability to make long distance movements (up to 280 km) to and from home and their sites of capture.

Females move a lot less and they were also less active than the males at night. While nesting from November through until March, the females will travel long distances looking for suitable nesting sites, especially favouring sand banks around the river mouth.

Swimming with Crocodiles



It's just possible that crocs have a sense of humour.



If you follow nature documentaries, recently there have been a couple of shows depicting divers getting into murky croc infested waters to encounter big crocs. Are they crazy, or do we over-emphasise the risk from crocodiles?

The motive for doing this diving work was to create a thrilling premise for a film, but there are a number of reasons why one might think of diving or swimming in croc-infested mangroves, e.g., to visit a special site like a historic wreck, to do marine research, for the thrill, or because there is nowhere else to dive or cool off locally.

I happen to think that deliberately diving or swimming with crocodiles, especially large ones, is crazy. Inside a shark cage, maybe. While you may not get attacked straight away, crocodiles are a very adaptable and

highly unpredictable predator. The people who have tried it successfully have been lucky and, if forced to make a choice, I'd rather dive with a large shark than a large crocodile.

In the nature documentary, the successful diving team went to a swamp in Botswana where the crocs had never seen people before. They also avoided any area with crocs larger than 3 metres. No-one lingered on the surface, where crocs usually make their attacks, but sank quickly to the bottom. The danger wasn't staged. One diver was approached aggressively by a 4 metre croc that he managed to fend off with a metal rod. Once they located an animal they quietly swam up to it. The crocs apparently didn't know how to assess these new riverbed intruders. "To say that there's a connection between human and crocodile here is plain naiveté, we are not under any illusion of grandeur. This is a very successful predator."

It's interesting that even after the success of the dives, the divers noted, "the idea of SCUBA diving with a Nile crocodile didn't seem like a good one, even with the added value of retrospect". The biggest benefit of the dive was not the croc encounters, but that they were able to discover and map unique cave systems that are important to this fragile ecosystem. There is an on-line video of amateur photographers who later tried to repeat this dive in shallow, dirty water in breeding season and got badly bitten for their trouble.



It's a local saying: "why are there no dangerous sharks in the NT... the crocs ate them." This five metre crocodile was photographed polishing off a 3 metre bull shark in the Kakadu

Poncho the Love Croc

Nearly 20 years ago, a five-metre-long crocodile was shot by a farmer on the bank of the Parasmira River in Costa Rica. The crocodile lay severely injured on the bank, A local named Chito rescued the croc and called him Pocho.

"I just wanted him to feel that someone loved him, that not all humans are bad". "I love all animals, especially ones that have suffered."

Chito later released him, but Pocho followed Chito home. Over the years, Chito and Pocho **grew to trust each other** and **spent hours each day swimming together**. Pocho would even respond to his name when called.

Pocho died of natural causes in 2011 at the age of 50. Hundreds of people attended his funeral.



A Snappy Performer



Tueanhjai Pimsan works at the Sriracha Zoo, near Bangkok, Thailand where over 6 years she developed a special relationship with a crocodile called "Snappy".

Using a small piece of wood she gently urges the crocodile to open its mouth before putting her head inside for up to 30 seconds.

Tueanhjai said: "I am never scared when I do this because I have been doing it for many years and never had an accident." "I suppose it is a crazy thing to do most people might think, but for me it is my job and I like it.

"When I am working with the crocodiles we have a lot of trust and respect for them, and over time you begin to learn how they move and they learn about you too."

Croc Attack – the risks...

Yeah, but you're safe offshore, right? Aren't all the statistic people swimming in rivers out bush?



Every crocodile species is different. American alligators are relatively timid and rarely attack. Nile crocodiles are statistically very dangerous and attacks could be as high as 745 p.a., of which 63% are fatal.

There are 2 species of crocodile in Australia, only the saltwater crocodile is a man-eater. It is also found in freshwater rivers, along beaches and swimming in the open ocean as much as 30 kilometres from the nearest land. Worldwide, salt water crocodile attacks are relatively low, 30 attacks per year of which 50% are fatal, although this species does tend to live in areas with lower human population densities. Some crocs under 3M will attack people in territorial non-fatal attacks. Fatal attacks are generally from crocs in the 2.5–5 m (8.2–16 ft) size range.

Croc attacks have been slowly rising nationally in Australia. According to the Queensland-based Crocodile Specialist Group, saltwater-crocodile attacks in Australia have increased from one every two years in 1971 to seven every two years today.

Within the crocodile species, each crocodile behaves differently, with some individuals being particularly aggressive towards humans on

shore, or in boats. The hide of 'Sweetheart' is preserved in the NT museum. He was notorious for attacking and sometimes sinking aluminium dinghies in the Finniss River, but he left the occupants alone. Saltwater crocodiles are highly territorial and very intolerant. The build-up to the wet season in northern Australia stimulates courtship and mating behaviour in estuarine crocodiles. Interaction between males includes combat, leading to serious injury and even death. Females also become intolerant of other females and will jostle for dominance. Nesting takes place throughout the wet seasons (from late October to May/June) when females will also act aggressively if a guarded nesting site is threatened.

People have usually been attacked while sleeping near rivers, wading in knee deep water and most often while swimming in or near rivers. Some of you might say that at least people kayaking, swimming or diving offshore are safe? Aboriginal people do say that diving to the bottom puts a lurking croc off attacking and they aren't very common in the open ocean away from river mouths. Safer isn't the same a safe though,

Case Study 1-diver in shallow mangrove muck

In 2009, in Raja Ampat Indonesia, an American diver was in the mangroves to photograph unique 'muck diving' critters in very shallow water. The dive guide suddenly took off pointing towards an object, a 4 to 4.5m adult male croc. "Within five seconds of seeing the crocodile, I was struck. Springing back, I narrowly avoided having my skull crushed by its jaws". The crocodile bit down and tried to roll and drown him. The guide bravely returned and plunged his fingers into one of the reptile's eye sockets. This failed, along with a strike by a small dive knife. The dive buddies retreated to get more weapons. The crocodile suddenly let go, latched onto the diver's left hand and pulled him along the sloping bottom to a depth of 10m. The diver has been passive and confused

until then, but now fought back by putting his fingers into the crocodile's damaged eye. After a while the croc let go and swam away. The attack lasted only two minutes and 16 seconds according to the dive computer, although every excited witness said it was ten or twenty minutes. The diver recovered after treatment for lacerations.

Case Study 2 – diver in poor vis inshore reef

Marine biologist Tony Ayling was scuba diving on some reefs in poor visibility near Cape Flattery in north Queensland in 1996, when something grabbed hold of his foot. As the crocodile moved around and tried to get a better grip, he started bashing the crocodile's head with a metal object and tried to gouge his eyes. Then the croc tried a deathroll, but Tony grabbed on to the crocodile's body and kept rolling with him. When the croc started swimming away Tony got hold of the crocodile's legs in a firm grip. The croc then let go of Tony's foot and swam off.

Case study 3,4 & 5- Dirty inshore NT shallows

In September 2005 a 4.5-metre saltwater crocodile killed a diver collecting aquarium fish in the Northern Territory, at Trepang Bay, 15 miles east of Cape Don off the Coburg Peninsula. The water was only 4 m deep. The incident came only five days after a British snorkeler was killed by a four-metre saltwater crocodile while swimming off Groote Eylandt in the Northern Territory.

Just recently, a trepang fishermen was attacked in Knocker Bay, about 180km northeast of Darwin, once again on the Cobourg Peninsula. The relatively small 2m-3m long crocodile bit him on the head, neck, shoulders and arms, probably a territorial attack. He was in "deep water" at the time, however as trepang are usually found in muddy seagrass, it probably wasn't that deep or far from shore.

Case Study 6 – Spearo on GBR offshore reef



In 2011, a man from Cairns went missing while spear-fishing in waters off Bushie Islet in the Cairncross Islands Group, off the east coast of Cape York in far north Queensland. Only some of the man's diving equipment

was found and it said 'croc attack'. There had been prior incidents in the area with people in kayaks reporting attacks. A Cape York local said, "It'd be that big black bastard of a croc that sits up on the sandy cay on Bushy Island...It's about 14ft (4m). It's a monster, very territorial - it's been there for years." Filmmaker Ben Cropp had also seen the same croc and added, "Early summer is mating season for the animals, when the males are wandering further afield and looking for a female...On a recent trip we saw a lot of crocodiles and croc tracks all the way down the coast, and crocodiles at every offshore island we went to," he said. "We're talking six or eight miles out ... on one little sand cay we saw three crocodiles, with three big tiger sharks in the shallows. These look like lovely places to moor but they are actually very dangerous, and Bushy Cay is only about three miles off the coast so it's a lot closer to shore."

Is the Price of Fashion Cruelty?

At Last – An article about a nice handbag



Everyone in the fashion industry agrees that *Crocodylus porosus* skin exudes the perfect texture, scale and pattern. Top quality crocodile bags are preferred by well-known celebs like Posh Spice and actress Eva Longoria.

Typically, these coveted handbags cost \$60,000, but among Victoria Beckham's favourites is a bag worth \$160,000. Celebrities who can afford them have been prepared to wait for up to two years to own one. 'You get the impression that if the rich who have these bags do give a thought to the live animal that has been sacrificed for fashion, they simply regard it as a ferocious animal that lives in swamps and eats people, so there's no harm in killing them,' says Pat O'Brien, spokesman for the Wildlife Protection Association of Australia.

Selling crocodiles for high fashion causes the death of more than 9,000 young crocodiles. Those involved insist that, as well as being a viable business, providing crocodile skins for handbags is a way of culling the reptiles to keep the population under control. At the crocodile farm, the eggs are placed in trays in a large incubator. Later, several hundred baby crocs are kept in a fenced-off pen with a concrete base and a channel of water running through the centre. Conditions are crowded - eight farms in the Darwin area house more than 100,000 crocodiles. Animal rights groups say the crowded pens cause great stress to the crocodiles.



Crocodile expert Professor Grahame Webb insists the industry has to exist to keep numbers in the wild down. 'I wonder what do-gooders would say if it was the remains of their child pulled from a crocodile's stomach,' he says. But animal rights groups say no excuses from supporters of the industry justify the mass slaughter of crocodiles. They ask: how can Victoria Beckham and other celebrity Hermes fans refuse to wear fur because animals suffer, yet persist in carrying their crocodile Birkin bags?

For my money there are two issues here. Firstly, the impact on wild stocks from croc farming. This appears to almost nought as they are



booming despite crocodile farming. This means that luxury crocodile skin bags aren't a conservation issue. What remains is to find an appropriate humane standard to apply to an animal that is kept for farming. If Beck's draped herself in rashers of inhumanely kept bacon the story would be the same. The customer's income adds no clarity to the issues. Leave sad old Becks alone.

I agree that she should not be using crocs as fashion accessories, she should be eating them instead.[p.s. crocs are tasty].

Croc Culls

When animals compete with humans for space or resources, or there is a predatory event, there is usually a chorus of voices calling for culls. This is hardly surprising as when we are under threat, instinctively we lash out at the source.



In addition to the post-event furore, in more recent times there has been an ongoing long-term concern about growing crocodile sizes and their lack of caution towards humans. In the south it just seems like an animal welfare issue, but in the humid north it's a serious daily concern. In many areas it can be dangerous to take a midday dip, and humans are being forced out of popular swimming holes, fishing haunts and beaches as big crocs reclaim marginal habitat.

Governments get pilloried for not doing enough, but there are several good reasons why culls aren't especially effective. Firstly, its very expensive. In the old days people were paid for their ammo, car

expenses and accommodation in the form of income from skins. Without a market driver for shooting, it's going to cost a packet. It is also highly ineffective unless you basically exterminate all the crocs. As males will travel hundreds of kilometres to occupy new territory, shooting out the areas around your town can only provide temporary relief. If it lulls children (or tourists) into thinking it's now safe to swim in the local river, then another fatality is only a matter of time.

If something is going to cost taxpayers a packet, then it needs broad based support. While many people in the north are fearful of crocs, many fishermen have also adapted to them, like seeing them, and don't want them wiped out. Around Darwin, the Larrakia people are unlikely to allow any shooting on their land, as they have a spiritual connection with saltwater crocodiles. Many other Aboriginal groups might shoot some, but only in a low level sustainable manner. They have small numbers of permits for guided trophy hunting. In the eastern States there is also the issue of widespread opposition from conservation groups.

No surprises that the early attempts to control crocs have centred around the major population centres of the north, Darwin and Cairns. In Darwin it has long been about selective removal from the harbour, local tourist spots and swimming holes. Early attempts to relocate have been abandoned as the miscreants just reappeared in the same spot later, now they are given to crocodile farms or shot.

With crocs appearing off Cairns tourist beaches for the first time, and a new conservative government in power, Queensland is also getting on board the culling bandwagon. Some areas of Qld crocodile habitat support a huge and valuable tourism industry. Cairns was literally developed from a swamp and has grown partly because croc extermination has allowed it to market itself as a safe tropical paradise.

There is no evidence as yet of a spike in attacks in Queensland, the scheme is more about competition for land as the human population grows, and about managing the fear of attack. The last fatal croc attack in Queensland was in 2009 on the Daintree River, which was only the seventh death recorded since 1985.

According to Professor Webb, the creeks and "stumpy little rivers" around Cairns are relatively poor habitat for the reptile in any case and they are unlikely ever to support significant croc numbers. Qld PWS rangers also say the crocodile population is fairly constant. On their regular surveys of waterways around Cairns they expect to find one animal for every kilometre of creek. There is no doubt there are growing numbers of human inhabitants making increasing use of the waterways and beaches for fishing, boating, surfing and other leisure activities. There are 160,000 people living astride the Barron River.

The new conservative Government has announced a new policy and says it's trying to 'rebalance' the interests of humans and crocodiles. The LNP State Government has made the revitalisation of local tourism, hit hard by the high dollar and a lack of investment, a policy priority. Previously the Qld PWS only removed crocodiles selectively after they were creating a nuisance. A new "zero-tolerance" management plan for Cairns aims to rid populated areas of "problem crocs", but basically it's



about reducing the overall population numbers.

Private contractors will remove crocs from the Barron River, near Cairns, and the northern beaches. Separate

crocodile management plans have also been developed for Hinchinbrook, Cassowary Coast and Townsville's local government areas. Laws enacted in July allow for some areas to be made crocodile "exclusion zones", with scope to put in barriers to keep the animals from returning. Only one of these has been designated so far: a short section of the Ross River above Aplin's Weir in Townsville. Captured crocs are relocated to zoos or crocodile farms, but as that option has quickly become saturated, the rest are being shot.

Professor Craig Franklin from the school of biological sciences at the University of Queensland says the removal of crocodiles can have negative environmental effects. "These ecosystems have evolved over millions of years and crocodiles are an integral component," he said. He linked it to something fishermen would understand, "If you remove crocodiles from a river system, the catfish numbers increase and the barramundi start to disappear." "They're highly mobile, and the idea that you can make an area safe is irresponsible," he said. It is always safer to assume that a crocodile is present and to take precautions by not swimming or wading, and/or adopting safe fishing and safe boating practices.

Prof Grahame Webb, is a wildlife academic and Northern Territory crocodile farmer. He also isn't concerned about the effects the plan might have on overall croc conservation, and doesn't think shooting crocs is a problem if it's needed for public safety. "What does it matter? There's plenty of crocs." He is still calling the policy "pseudo-science and bullshit". "Queensland has always had a bit of an identity crisis with animals that eat people," he said. He thinks the risks in this marginal habitat aren't very high.

Supporters of the policy say it is a case of better safe than sorry. "It's just gone too far in the one direction. We are entitled to use our

beaches just like people down south. If they had crocodiles turn up on the Gold Coast or the Sunshine Coast there'd be a hue and cry on," said Cols Sparkes, regional manager for Surf Lifesaving in North Queensland. The Minister is looking to appease that sentiment, but is falling short of promising a return to the 'good old days', "[There's] no question that we want to conserve the crocodile and make sure we have a thriving population in Queensland, but there are some genuine public safety issues in North Queensland and we need to sort them out".

As that policy is eventually going to run out of money and political support well short of total regional extermination, I'd suggest you still don't don your budgie smugglers and try a marathon swim up the Barron River. Crocs are back, and they are here to stay!

Dungalaba (saltwater crocodile)



The saltwater crocodile is a totem for the Larrakia people. The Larrakia also refer to themselves as "Saltwater People" and speak for the tidal country around the present day city of Darwin. One of the primary clans of Larrakia people consider themselves to be Dungalaba descendants, "...and being Dungalaba descendants means we have a respect for the animal."

Crocodile is not traditionally eaten by Larrakia people because of this respect, and despite its fierceness, Larrakia people want Dungalaba to remain in the Darwin harbour as a protector of people. "We don't like to see our harbour without Dungalaba, even though we want to see safety for people to use the beaches, but a significant part of the harbour is Dungalaba."

The crocodile defines the identity of its clan descendants, "I suppose there is that nasty side of the Dungalaba, a bit snappy, so I suppose some Larrakia people are a bit a snappy."

Some Confronting Photos



Briony Goodsell was 11 in 2009 when she was killed by a crocodile in Darwin's semi-rural suburbs. She was doing what kids do, taking a dip in a local waterhole sign-posted as 'no public entry', in an area deceptively close to 'safe' residential homes. Recently a young Aboriginal boy was killed at Jabiru.



Playing with baby in the East Alligator River where crocs regularly use the road as a barrier to hunt fish. This picture caused outrage when it was published on Facebook. Some attacks are easily preventable and result from ignorance or unnecessary risk taking. The people involved couldn't see why it was a problem, there were plenty of adults nearby.

Boom and Bust – Croc populations

The skin of the saltwater crocodile, especially from the belly surfaces, is the most prized of all crocodilian skins for fashion leather. Demand for skins (for use in shoes, belts, suitcases, briefcases and handbags) supported a significant crocodile harvesting industry in northern Australia between the end of World War II and the 1960s. By then there were only a few thousand left. Contrary to some sources, hunting didn't stop due to 'greenies' but because you could no longer catch enough to make a living. The populations of these animals have recovered to their previous levels in most parts of Australia.



A representative sample of 735 kilometres of waterways between Cooktown and Maryborough was surveyed between September 2009 and February 2010. A total of 258 saltwater crocs were sighted, ranging in size from 0.3 m to 3.8 m in length. Of these, 73% were small, less than 2.0 m in length, indicative of a recovering population. The mean relative density of 0.49 crocs per kilometres was stable compared to previous surveys, with no evidence of a 'population boom' in waterways of the populated east coast of Queensland. Although crocs have been sighted from time to time south of Rockhampton, none were noticed in the survey. There was no evidence that crocs are expanding their range further south. In some places like Cairns, the close proximity of people has hindered recovery, as crocodiles are often removed. This is no

guarantee of safety. Crocodiles are very mobile animals, and can migrate up and down the coast. Humans always need to be careful even in populated areas, for a croc could have recently moved in.

In Western Australia the species is found in most major river systems of the Kimberley, including the Ord, Patrick, Forrest, Durack, King, Pentecost, Prince Regent, Lawley, Mitchell, Hunter, Roes and Glenelg Rivers. It is also found in Parrys Creek. The largest populations occur in the rivers draining into the Cambridge Gulf, the Prince Regent and Roe River systems. They have also been recorded in isolated rivers of the Pilbara region, around Derby near Broome and as far south as Carnarvon on the mid-west coast.

Northern Territory numbers have increased from 3000 in 1970, to 30 000–40 000 in 1984 and 70 000–75 000 in 1994. The distribution of Saltwater Crocodiles is expanding upstream to recolonise accessible freshwater habitats in the Northern Territory. There is an increase in the number of crocodiles that are living in other marginal habitat, such as along the coasts and at sea. The number of crocodiles removed from the 'Intensively Managed' zone in the Darwin Harbour has increased in recent years, indicating that animals in expanding populations continue to disperse.

Today the total Australian population is estimated to be around 100 000, although some believe the population to be 200 000. The numbers may be leveling off now, with the major changes being to the size of crocodiles in some of these rivers. The crocs are slowly becoming the more usual size and age for a large, slow-growing species.



People pressure and Port Phillip Bay

by Mike Jacques

Port Phillip Bay is integral to the lifestyle of millions of Australians. Since European settlement we have been fighting a seesawing battle to deal with all the damage modernity has done to the "The Bay".

Prehistory

The area around what is now Melbourne was until relatively recently a vast river plain, full of wetlands and lakes. The Yarra flowed down what is now the middle of the bay and formed a lake in the southern reaches near the sea. A big rocky outcrop (now called the Heads) separated the lake from the sea. After rain, the lake would spill over into the sea and gradually carved a river channel through the narrow rocky gorge. Several Aboriginal tribes were hunting across the river valley for perhaps 30,000 thousand years before the climate started to slowly change.

Only 7,000 to 10,000 years ago the last Ice Age ended and sea levels gradually rose above the Heads. Sea water increasingly flooded the lake after heavy weather and kept on rising until the sea completely drowned the low-lying river valley. Pt Phillip Bay was created from this flooding. Port Phillip Bay is now one of the world's larger enclosed waterways with a surface area of almost 2,000 square kilometres and a total volume of 26 cubic kilometres. The deepest portion is only 24 metres, and half the region is shallower than 8 m. Although it is shallow, most of the bay was navigable by the large sailing ships that arrived from

Europe in the nineteenth century. Aboriginal people were soon driven from the land to make way for farms. Large areas of land were completely cleared and erosion of soil into the bay gradually increased. Before the 1850s gold rush, the population of the catchment had grown to only 75,000 but the mineral discoveries spurred on both industry and a booming population. All those new people started pouring untreated waste into the bay.

The catchment draining into Port Phillip Bay is now receiving the run-off from a major urbanised area of almost 10,000 square kilometres occupied by a population of about 3.7 million people.

One of the big challenges is that the enclosed shallow water mass is poorly flushed. The average exchange rate for Bay waters is once every 12 months. It flushes more frequently in the southern part closest to Bass Strait and less frequently in the north and in Corio Bay, where the pollution is often the heaviest.

Like many other bays in Australia, the mid 1970s saw a peak in industrial pollution and also a renewed commitment to improve water quality.

Sewerage and stormwater

The major marine pollution issues are sediment loads in stormwater and the nutrient levels from stormwater and treatment plants entering the Bay.

By the close of the 19th century, the waste and sewage pollution of the Yarra River were causing serious health issues. This led the Melbourne Metropolitan Board of Works to start on a major sewerage program at Werribee in 1893, with the first Melbourne homes being connected to a waste treatment plant in 1897. The technology didn't always keep pace

with demand and by the 1970s the Bay was often described as 'full of poo'.



Then there was a major upgrading of sewage treatment. Nutrient levels have been reasonably stable since 1984, which is a commendable achievement in a rapidly growing city. More recently, in 2005, new technology was introduced at the Western Treatment Plant

which cut nitrogen output into the bay by more than 500 tonnes a year. A new target calls for a 1000 tonne reduction per annum.

While we can fairly readily pour money into treating what comes out of a single sewerage pipe, Melbourne's thousands of kilometres of stormwater drain are a problem on a grander scale. Stormwater drains dump nutrients, litter, debris and silts into the Bay.

A stormwater outfall will now often have more harmful nasties in it than a sewerage outfall, especially after summer storms. A sudden flushing of the drain network will wash oil off roads, collect runoff from illegal or broken sewerage connections and collect litter. This often leads to a toxic algal bloom at a nearby creek or beach that can cause beach closures. It's also no fun to stroll along the beach dodging rafts of litter washed out of nearby creeks and stormwater outfalls. Building and maintaining sediment and litter traps, or trying to treat massive volumes of runoff after a storm, could end up being a huge expense for struggling councils and we are generally reluctant to pay for it in big rates hikes. Ironically, our big water bills have helped by making us

collect water for the garden. This has been reducing flows of stormwater nutrients and sediments to the marine environment.

Heavy metals

Our industry is a lot cleaner than it once was, and most of our troubles with industrial pollution are about managing the legacy of past neglect. Unregulated outfalls of nasty chemicals in the last 150 years have contaminated sediments in the Bay and this has entered the marine food chain, especially in the northern part of the Bay, and at Geelong.

In the 1980s, mercury, cadmium, lead, Dieldrin, DDT,DDD, and DDE were all found in the Bay. Apart from poisoning the humans who ate the fish, the fish themselves can also have problems with conditions such as fin-rot, neoplasms, lesions, diminished reproduction success and lens cataracts. Mercury concentrations in flathead declined after 1990, when new EPA regulations required industrial effluent to be flushed into the sewer rather than dumped straight into the stormwater drain. In the 1990s, mercury contamination in sand flathead in Port Phillip Bay still exceeded the National Health & Medical Research Council (NHMRC) limit¹, but it began to fall. The 1996 CSIRO Port Phillip Bay Environmental Study found that a decline in mercury concentrations has been sustained.



The northern end of the bay is still not in great shape. A long-winded government health advisory doesn't quite say "don't eat fish in the lower Yarra and Maribyrnong rivers". I think they should stop mucking around and call the pamphlet "Fishing there!,

are you mad?" The main problem in this area is the polychlorinated

biphenyls (PCBs) in the sediment. PCBs were used from the 1930s to the 1970s in industrial products. They have now been phased out, but they stay in the environment for a long time. They concentrate in fish tissue and are worse in some species like eels and bream.

There have been problems with the fish population in other areas of the bay too. Studies in 1968-71 and 1996 showed a decline in mud ghost shrimp and sand flathead populations. Flathead were once considered to be the most abundant fish species in Port Phillip Bay, but their numbers are estimated to have fallen by 80% since the 1970s. Since the 1970s growth rates in surviving fish have also slowed, particularly in the first four years of life.

Some people cite pollution effects as the cause of a drop in fish numbers, but in a bay so heavily fished, I suspect it would be hard to separate pollution impacts from overfishing impacts.

Dredging



If you have a heavy metal problem then you need to avoid stirring up the bottom and remobilising all those buried chemicals. However, more economic growth means bigger

ships. We regularly need to deepen Pt Phillip's shallow shipping channels. Maintenance dredging of the Yarra every 2-3 years, and dumping of sediments in the northern bay, has been ongoing since settlement and has been very active since the 1950s. In 2009, a new six square km Dredge Material Ground (DMG) was constructed to contain 4 million m³ of contaminated dredged sediments. Dumping of dredged sediments taken from the Port of Melbourne to the spoil

grounds has resulted in elevated concentrations of cadmium, lead, zinc, and other metals at the dump.

The proposal caused a public protest and the EPA monitoring program was expanded for the duration of this Channel Deepening Project at the DMG, and for two years following its completion (from 2008 to 2011). A CSIRO Study stated that spoil dumping shouldn't result in contamination of surrounding areas, but contaminants have been elevated at times and locals voiced their suspicions that the spoil dumping was involved.

It is likely that the local marine life doesn't react well to these remobilised contaminants. The Environmental Study of Port Phillip Bay in 1968-71 found ghost shrimps to be the second most common bottom-dwelling species in sediments around the Bay, including near



the present day DMG. The species was not reported there at all in 2006, but it was still common at the south-eastern dredge material ground (offshore of Mt Martha) where the shrimps still get buried, but only by 'clean' dredge material from the southern bay.

Fishing

Pt Phillip has a long but declining history as a major commercial fishing ground. The effects of industrialisation have pushed usable fish stocks into the southern bay. More recently, this has been followed increasing pressure from competing recreational and environmental interests.



There have been grounds for concerns about past commercial fishing activity. When the Port Phillip Bay scallop dredge fishery commenced in 1963 there was no regular scientific monitoring of the Bay seabed, so we don't know what the bottom was like before this heavy fishing pressure.

Dredges raked over most of the bay in depths greater than 10 metres, causing booms and busts in scallop stocks until the fishery was closed in 1997.

This closure decision was the first time a really large commercial fishery had been closed by a single political decision unrelated to stock sustainability. It was driven by the growing recreational and tourism use of the bay, especially dredging's perceived impact on recreational fishing. Recreational fishermen were particularly alarmed by declining snapper catches. Scientists had also suggested that scallop dredging was reducing the ability of the seabed to process the massive nutrient in-flows from the city.

Studies did show that dredging activity was removing 20-30% of bottom-dwelling life each pass, causing some small animal species to crash and others to boom in the vacated space. These numerous burrowing species can be very important in turning over the sediments to reprocess nutrients. While the impacts of dredging may well have been significant, not all animals were affected. The volcano-like mounds of ghost shrimp (up to 10cm high) were flattened by dredges but the shrimp themselves survived dredging and mounds were rapidly rebuilt.

Now that dredging has ceased the bay may well recover some of its former 'natural' benthic diversity.

This doesn't mean table fish stocks will recover, because the growing pressure on fish stocks in recent decades hasn't been from the commercial sector. There are 800,000 recreational fishers just in Victoria and most won't acknowledge that their sector has more than a minor impact on fish stocks.

Dr Mark Norman's recent study confirmed that in Port Phillip Bay, boat-based recreational fishers can catch 2.7 million fish annually. This is almost as large as the commercial catch. Snapper has been the fishery most fought over, but here the recreational harvest arguably has a greater impact on snapper stocks. Commercial snapper harvests are slightly larger by weight, but recreational fishers will catch many more smaller fish. They caught three times more fish (22,000 fish recreationally versus 7,000 commercially in a four month survey). These figures are likely to be underestimated and don't include night fishing, shore fishing, charter fishing and catch landed outside the survey areas.

Recreational fishing pressures are also growing because of increased participation, more efficient gear, and increasing access to areas. According to a CSIRO study the bottom is being denuded of fish, except for stingarees that no-one is eating. *"Increased fishing pressure is the most likely explanation for declines in several important commercial and recreational species."*

Impacts of introduced species



To add to the Bay's woes, we are importing many species that shouldn't be there, especially on the hulls and in the ballast water of ocean-going ships. Over 3000 commercial ships visited the Port during 1998/99, moving to or from 200 different international and domestic ports. The Port of Melbourne

is also highly modified and disturbed, which may makes it more susceptible to successful introductions of pest species. Apart from pollution, the area has been reclaimed and dredged. The delta of the Yarra River was once 90 km² but this has since been halved. Much of the original aquatic fauna and flora of the area has probably been lost. In this sheltered and nutrient-rich ecological vacuum, pest species can flourish and get a head start.

Over 100 species are known to have been introduced to Port Phillip Bay. The major exotic species are European shore crabs, Pacific sea stars, European clams, Asian date mussels, European fan worms, Japanese undaria seaweed, yellowfin gobys, northern sea squirt *Ascidrella aspersa* and many other small species. Many have become abundant and are contributing to profound changes to the ecology of the Bay. A few North Pacific Seastars (*Asterias amurensis*) were recorded in the Bay in the mid 1990s. Now they are common in the northern bay. This species virtually eliminated native molluscs when introduced to the Derwent River in the 1980s.

These pests outcompete some native animals, including many that have key roles in the ecosystem, like perhaps mud ghost shrimps. They don't explain every change that has occurred in the Bay. The decline of species like sand flathead was identified well before some of these major pest species were recorded in the Bay. Pests, like weeds on land, aren't all the same and some do little harm. They can also fall prey to an adaptive predator. Two recently introduced species (European clam *Corbula gibba* and *Pyromaia tuberculata*) have become important in the diets of fish as other traditional food sources dry up. Pests generally don't like competing with better adapted native animals in clean waterways. The news is often bad, but it isn't hopeless.

Summary

Port Phillip is a central part of the Melbourne lifestyle and, particularly in the southern bay, it's still a healthy and thriving aquatic playground. Having said that it still has some serious problems. A lot of good work has been done to reverse those impacts, but sometimes we don't own up to an impact when it interferes with our 'freedom' to keep doing something unsustainable.

Blaming one source or the other for the 'major' impacts on Port Phillip Bay ignores the way our impacts interact and the practicalities of modern life in a place where millions of people live. We can't ever turn the clock back to that pre-settlement pristine drowned river valley. Closing the port, and that is what no dredging at all would eventually mean, isn't a viable option. Substantially stopping fishing isn't necessary, or likely to get popular support. Even the accidental litter from millions of people would be enough to mar our waterways. That doesn't mean we can't manage what we do now more intelligently, to the maximum extent of our available resources and technology.

(HERITAGE) FEATURE - QLD

Was there a 'real' Crocodile Dundee? – Vince Vlasoff and Lloyd Grigg

by Mike Jacques



The ready availability of .303 rifles in the wake of World War II provided a cheap powerful gun that would reliably kill a saltwater crocodile. Political unrest in Africa also cut off the usual supplies of crocodile skins used for fashion goods, increasing prices. Good money lured some hardy men north.

The hunters included men from the southern States, good shooters with a desire for something more after being demobbed from the army. Vince Vlasoff, was the son of a Russian émigré engineer. Lloyd Grigg was a tattoo-covered "Desert Rat" at a loose end. They were sharpshooters who stalked the crocs in daylight and prided themselves on a quick kill with a resultant clean hide. Their methods only dented local croc populations. Vlasoff built a steel launch, *Tropic Seas*, and using this to get to more remote rivers. The media soon caught on to the trade. Instead of talking about mosquitoes, heat, bad food and the stench of sun-baked croc hides, they told stories of manly and glamorous hero-figures, like a Hemmingway novel. The 'romance' of this adventurous lifestyle soon



Photo Phil Watson, Port Phillip is also uniquely beautiful and natural as well as impacted by man, the Lonsdale Wall.

came to the attention of ordinary people. Some wanted just to experience the storybook lifestyle of the 'great white hunter' on safari, without all the hardship. Melbourne hairdresser Rene Henri was one. Henri founded the Australian Crocodile Shooters' Club in 1950. The Club was basically aimed at well to do hunting tourists.

Henri sought two partners. Vlasoff, with his engaging smile, trademark pith helmet, and safe boat was the perfect cruise skipper. Grigg was the more ardent hunter and a perfect guide. To appeal to tourists he made a crocodile skin coat and hat. In it he looked like Errol Flynn from "Robin Hood", although he complained that the outfit "wasn't very practical". The Club promoted safari cruises along Cape York, and later from Karumba.

Crocodile numbers crashed as more part-time shooters using spotlights and 4WDs entered the trade, especially in more accessible areas like Cairns. Many of the hunters and tourists, were poor shots and the kills were inhumane. Vlasoff and Grigg could see crocodiles disappearing. It had changed from hunting to extermination and by 1952 they parted ways with the Club and were opposed to further hunting.

A few years later Henri came to the same conclusion, as did many of the early professional shooters, "*The crocodile ...[has] the right to exist, in his own country, in his own rivers, and we should be proud to have the crocodylus porosus, the best and the last of the antideluvian saurian*". Vlasoff and Grigg wanted to make a living from a more sympathetic type of tourism. They saw that Green Island, just off the Cairns coast would make it an ideal tourist resort. They needed an attraction and bought a war surplus Navy dive chamber and converted it into a submerged underwater observatory. The entire structure was reinforced to withstand up to 96,000lbs of pressure.

Getting the structure the 27 km from Cairns to Green Island took over 18 hours, travelling at 1 knot. The observatory was sunk near a

prominent foreshore coral reef and held in place by steel pins and sea anchors. The venture was a success and the observatory still exists today. It did a lot to create the image of the Great Barrier Reef as a pristine tourism mecca. It also proved that Vlasoff and Grigg weren't 'gun mad' idiots. Vince and Lloyd were restless souls always on the look for a new project and in 1960 added a Croc show/aquarium "Marineland" to the Green Island venture.

Vlasoff had been a very early underwater photographer with a home-made housing. At one point during the war his camera and odd name led to a police investigation to check if he was a foreign spy. Later Grigg also developed an interest in underwater photography and created a large portfolio of reef images.

Vince loved Cairns and was a well-known local identity and tourism charter operator. His suburban house was a refuge for rescued small crocs. On one occasion they escaped and ran amok through the streets of Cairns. He was also interested in the history of the area. An American tourist he was taking out fishing proved to be the inventor of aerial magnetometers and a keen explorer. They got involved in a project to look for the anchors and cannons that Captain Cook had jettisoned when H.M.S. "Endeavour" ran aground on the reef.

In 1969 the *M.V. Tropic Seas* was used as the platform for the expedition that discovered 6 of Cook's cannons. *Tropic Seas* was then chartered by the Department of Shipping and Transport, to recover the cannons. One was sent to the U.S.A, one to N.Z., one to the U.K. and three were kept for Australian museums. Vince wanted to find the missing *Endeavour* anchor and asked scientists to get a magnetometer, and join him in the expedition to find it. This time Vince provided his boat for free. A venturi suction dredge was devised and built from scrap in Cooktown and they 'borrowed' a self-priming pump with 30 metres of firehose and a nozzle. The magnetometer located the buried object in the suspected location, and it was recovered with the suction dredge.



Far right; Vince Vlasoff in his pith helmet

By 1980, Vince had helped to start a marlin game fishing tourism industry off Cairns, attracting big names like Lee Marvin, the American actor. Once again everyone got involved and Marlin game fish looked like going the same way as the local crocs, but now Vince had powerful friends. He led the local game fishing association in a fight against longline fishing vessels in the Coral Sea. "Area E" is the only known spawning grounds of the giant Black Marlin. This work led to a ban on all foreign long lining in this area.

In 1986 Vince passed away on "*Tropic Seas*" after a heart attack. Grigg died at Bundaberg in 2003, aged 87. In 1988, Little Upolu Cay off Cairns was renamed Vlasoff Cay.

FEATURE - OLD

What happened to Green Island?

The Crocodile hunters, Vince Vlasoff and Lloyd Grigg, set up the marine observatory on Green Island, to make a living in a more environmentally friendly way than shooting crocs. Would they be turning in their graves today to see what has happened to Green Island?



Their enterprise helped to publicise the Cairns region as the way to see a 'real' tropical reef, and establish it as a world-wide tourism icon. In fact, the inner reef site was picked because it was already popular, sheltered and accessible. It was never one of those clearer and more diverse outer reef coral sites. The sand on this vegetated coral cay moves regularly so the foreshore corals naturally never get too established in the way they do on tropical reef wildlife documentaries. Having said that, there have been some pretty dramatic changes to this island...

Before Europeans arrived, Green Island was quiet little cay used as an important Aboriginal initiation site. It was taken over by beche de mere and turtle fishermen in the 19th century. In 1873, four fishermen were massacred on the island by their Aboriginal divers, allegedly because the workers weren't fed properly, but I suspect it was built-up anger with many legitimate sources of grievance.

It started to be a popular spot for local Sunday launch trips from the 1890s. In 1899 coconut trees were planted. The site was made into a recreation reserve in 1906. Regular passenger ferries started in 1924. One American visitor in 1928 described it as, *"one of the true beauty spots of Australia, at least that is the impression we shall carry away with us after having visited practically all the tourist scenic spots in this great outdoor land"*. In terms of coral reefs it was also in great

condition, *"Having explored in the South Seas it is not saying too much to remark that Green Island is practically a virgin coral isle and makes a great study for the lover of nature; and here's hoping the people of Cairns keep it as such-one of the valuable assets for tourists as well as home folk"*. They appreciated the colourful fish and coral, but already there was a problem with broken glass on the beach.



Turtle riding eco tours, popular with tourists of the time but low on sustainability

Glass bottomed boat tours started in the 1930s and there was primitive aquarium onshore. Up to 150 people at a time might visit the island, or camp ashore. A hotel was built there in 1942 and once pumped its raw



were experiencing the tropics for the first time.

In 1954 the underwater observatory was placed near a jetty that boasted an intact and quite colourful reef. Back then the inner reef water quality was apparently a lot better, and they were yet to record the big plagues of Crown of Thorns starfish that are a recurrent feature of the reef today. Carbon dioxide in the atmosphere was way lower than today, and no-one needed to talk about climate change impacts. There were no concerns about acidification of the oceans destroying corals.

The runoff from land clearing and the use of agricultural chemical fertilisers as we industrialised our agriculture, has since dirtied the water. The visibility today is often down to 5M, although we

don't really know how dirty it was in the 1950s. The runoff may be aiding Crown of Thorns starfish outbreaks. The last big one was in 2002 and their numbers are building again. The most recent plague started in



sewerage out onto the reef flat. Seaplanes started arriving in 1978 and now helicopters also deliver some of the wealthier landlubbers. Although it's an inner reef site, the island was still pretty remarkable, especially for people who

the Cooktown-Lizard Is sector in 2006 and this plague produced very large numbers of larvae that are travelling south on the currents. Now Green Island is again in the path of this southward advance. Recent surveys showed lots of small starfish on Green Island. Substantial loss of coral cover will follow.

This small 12 hectare island also gets 385,000 visitors a year and is the most visited site on the reef. On Green Island the first boat arrives around 9 A.M. and about 500 people get out. The more serious divers and snorkelers go further out to Norman Reef, where there is a large moored pontoon. More boats arrive during the day and there may be up to 1000 tourists on the island at any time during peak periods, but this has fallen from a previous high of up to 1900. Visitors from Asia predominate and 95% of visitors are day trippers. A few stay behind when the place becomes mercifully quiet of an evening.

Overloading the local fringing reef with untrained snorkellers has apparently caused damage. A recent study of tourist damage at Orpheus Island shows that soon after opening a dive trail the corals decline. Even with a relatively small number of snorkelers, an average 15 guests weekly, damage occurred quickly to the fragile *Acropora* coral tips. Previous research has shown that the larger, floating tourist pontoons, where as many as 160 people snorkel every day, tend to disperse the effect of any breakages. There is some anecdotal evidence that the Green island fringing corals aren't a patch on what they use to be decades ago.

The helicopter flights are limited to 5 a day, but the noise has driven the seabirds to the western part of the island, and the downdrafts break up the nests of pied imperial pigeons. Boats scar the seagrass and tourists overfeed birds and fish. Large populations of aggressive reef herons have bred up and attack other birds. *"They have become accustomed to*

an easy feed from the tourists and often fly up and grab a sandwich out of your hand just before you get to take a big bite. It's got so bad that the buffet enclosure is now caged. So the humans are inside an aviary to eat and the birds are on the outside". Schools of trevally also come up from deeper water at feeding session times and similarly prey on local fish.



As dire as some of this sounds, the area is as well-managed as it can be in the circumstances. 85% of tourists visiting Cairns stop at the island. In a GBRPMA survey most didn't think it was overcrowded (probably by Asian attraction standards). Mostly they are drawn by the climate and natural scenery.

85% of visitors will go to the marine observatory and do the glass-bottomed boat. Only 12% get wet and go for a snorkel. While most people seem to enjoy the day out, 25% wouldn't do it again.

For some families from Asian mega-cities it is a major landmark in their holiday experience. It is often the first interaction that many people have had with a natural marine ecosystem. Andrew Darby has written, *"Among the hundreds of visitors to this coral island off Cairns this day is a noisy Chinese family, clearly on their first foray into the world of the snorkeler. It's a riot, watching them. Secure in neck-to-knee swimsuits and life jackets, mask and flippers, they lie face down first in ankle deep water, rising occasionally to splutter and laugh. Gradually a few kick out waist deep, and shouts of amazement volley back to others onshore. Even on the tourist-hammered coral and seagrass beds off Green Island beach, the reef works its magic".*

My guess is that the crocodile hunters, Vlasoff and Grigg, would be pleased that there is still so much of that magic, but would be taking their own families to somewhere a bit quieter. Whatever Green Island must absorb, perhaps that is only saving somewhere more pristine from all that tourist pressure. You never know, under all that carefully controlled mayhem, perhaps someone is actually learning about the importance of conserving coral reefs at home too.



(HERITAGE) FEATURE - TAS

Old whaling ways Part II

The Life and Loss of the "Maria Orr"

by Mike Jacques

William Orr was a prominent merchant, landowner, and shipping agent. Apparently he was also a very sincere and likeable guy. He had a store on the old wharf at Hobart. With a fleet of small ships he organized some of the early sealing and whaling voyages, and by 1831 he was shipping large quantities of whale oil to London. By 1837 he had whaling stations at Recherche and Storm Bay and became a prominent as an investor in large ships for the deep-sea fisheries. He also understood the timeless concept of 'Brownie Points', naming his first ship after his wife. *[what else did he do other than name a stinky old ship after her - Alison]*

In 1838, his 289-ton *Maria Orr* was launched, the first full-rigged ship built in Hobart. The government presented a suit of sails as a reward for starting a new industry and Orr's enterprise was applauded as a great benefit to the colony. *[which I expect meant that he was allowed to do things for her without complaint - Mike]*

The *Maria Orr* sailed on her first voyage under the command of Captain Chamberlain. She returned on November 3, 1839, with 150 tons of oil and eight tons of bone. She made many other voyages as far as Kodiak Island, off the north-west coast of America.

Most of Orr's profits from trade and whaling were invested in land *[now you're talking - Alison]*. His holdings increased by purchase and lease to some 80,000 acres (32,375 ha) in various parts of the island. When depression struck in 1841 he was one of the biggest and wealthiest

merchants in Hobart. Caught with many bad debts, he had to get help from friends to meet his commitments [*Brownie bank bottomed out-Mike*]. When he was riding home one afternoon his horse was frightened by a gang of boys and bolted. It stumbled outside the Waggon and Horses Inn. Orr had a violent fall and fractured his skull. He was unconscious for three days and died on 2 November 1843 [*that's bit inconsiderate - Alison*].

The vessel was taken over by Captain McCarthy, and Charles Seal. In February 1846, the *Maria Orr* sailed on a whaling voyage to the north west of America via Recherche Bay. She was well stored and provisioned, and was manned by a crew of about thirty men plus officers. On Tuesday, 10th, she was in Recherche Bay getting ready for sea in a building storm. At 4.30 p.m., the wind swung suddenly round to the southward, accompanied by torrents of rain. This forced them to delay their departure for the night. At 4.30am, with the gale increasing, a heavy hail squall came over and parted the anchor chain. The ship struck on the small reef to the eastward of Kelly's Point within one hundred yards of the shore. The ship soon heeled over and was lying on her broadside, and one man (Henry Smirridge) was drowned.



A nearby vessel heard the cries and the rest of the crew were saved by the "Abeona". "In twenty minutes from the time of striking she became a total wreck, parting in several places, and in one hour scarcely a vestige of her was to be seen above water". Not a single article belonging to the ship was

saved that day. The crew were left in Hobart without even a set of clothes and had to rely on charity. By March the wreck had been heavily salvaged and the goods taken to Hobart to the stores of Thomas Hewitt

where they were auctioned for the insurers. The salvors were thorough, with virtually every substantial item aboard coming up for auction. The wreck was also to be sold, "as she now lies in Recherche Bay, in about four fathoms water".

More recently divers have attempted to locate the wreck, which had resulted only in a few scraps of Muntz metal (copper hull sheathing) and broken crockery being found, some of it against the shore off Kelly's Point. The salvage must have been very thorough for metals, suggesting she was largely high and dry at low tide. The wood has gone to shipworm, but it should have left behind some decking bolts in the same fashion as the "Offley". A mystery that more hasn't been located.

In calm weather the Kelly's Rocks area is a great place for a kayak, snorkel or dive. These exposed rocks not far from the shore are named after James Kelly, a prominent Hobart whaling identity. The submerged rocks further out to sea are called the Denmark Reef. These two sets of rocks are actually the main spires of a larger volcanic reef system. The reef is about 500 metres long and varies in width from 50 to 200 metres and up to 14 metres deep. The rocks are also quite attractive with some impressive growths of weed.



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