

Awesome Australia

Diving Down Under the Land Down Under



Australian Appetizers Down under Down Under

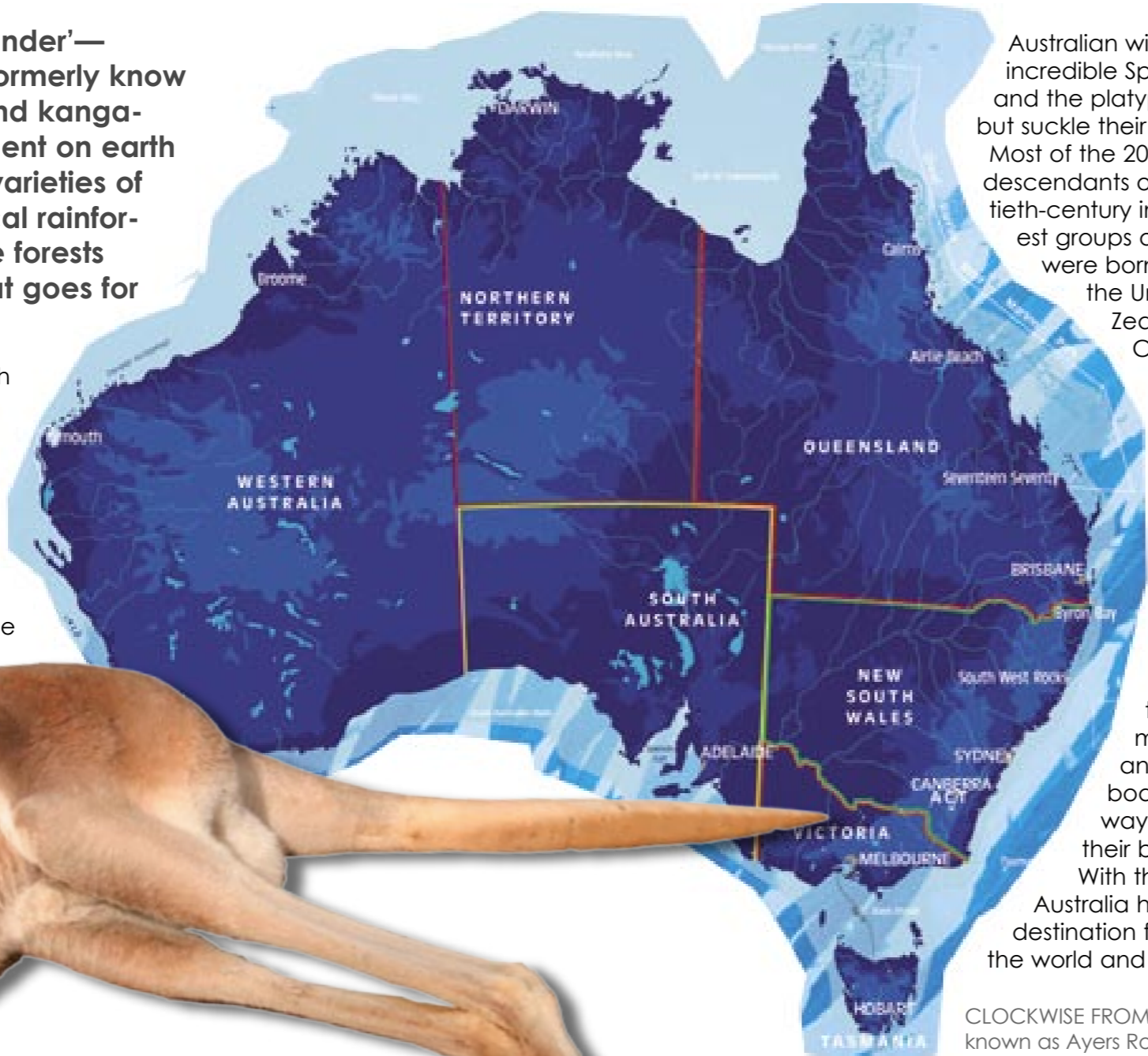
Introduction text by Wandy and Tim Hochgrebe
Underwater photography by Tim Hochgrebe
Topside photography by Yann St. Yves
A coproduction with underwater.com.au

YANN ST YVES

Australia—the land ‘Down Under’—renown for Uluru (the rock formerly know as Ayers), its red desserts and kangaroos. But the smallest continent on earth features one of the largest varieties of habitats ranging from tropical rainforest to old-growth temperate forests and alpine heaths—and that goes for underwater as well.

Due to the unique environment with nutrient-poor soils, highly variable weather patterns and geographic isolation, a high percentage of Australia's flora and fauna is endemic and extremely well adapted to their unique surroundings.

The koala in its gum tree is probably one of the best-known icons of the



Australian wildlife, but there is also the incredible Spiny Ant-eater (*Echidna*) and the platypus who both lay eggs, but suckle their young.

Most of the 20 million Australians are descendants of nineteenth and twentieth-century immigrants. The five largest groups of the Australians who were born overseas come from the United Kingdom, New Zealand, Italy, Vietnam and China. Only a very small percentage is made up of the indigenous people—mainland Aborigines and Torres Strait Islanders.

Relaxed

Australians are known for their relaxed attitude, their openness and their love of nature—and all of that is true. Australia is home to many races and religions, and on the whole, everybody accepts each other's way of life—and they all love their beer ...

With the increase of air travel, Australia has become a popular destination for tourists from all over the world and anything to do with

CLOCKWISE FROM TOP: Uluru formerly known as Ayers Rock; Seahorse; Dolphin trio; Wobbegong; map of Australia; resting Kangaroo



JOHN SMITH - UNDERWATER.COM.AU



KAREN WILSHAW - UNDERWATER.COM.AU



STEVE GRIFFIN - UNDERWATER.COM.AU





Koala bears snuggle in deep sleep, nestled in the branches of their favourite Eucalyptus tree

water is extremely popular with locals and tourists alike. The 2005 Surfing World Tour featured five Australians in the top ten—surfing is a cultural icon of Australia. But other watersports like diving and snorkelling enjoy growing popularity.

Although most tourists are aware of the Great Barrier Reef off the North-East coast of Australia, more and more people are discovering the excellent diving in other parts of the continent as well. With a coastline of almost 26,000 km—much of it still reasonably unspoilt—it should not come as a surprise that there are plenty of spots to find amazing marine life.

In the harbour of Sydney, the largest city in Australia, in only a few meters of water dumpling squids, anglerfish, Port Jackson sharks and seahorses as well



as their close relative the endemic and incredibly beautiful Weedy Seadragon have found their home.

Further south, kelpforests, seal colonies, rock lobsters, abalone and a multitude of sponges and ascidians colour the rocky reefs.

Off Adelaide, divers have the



So where the 'bloody hell' are ya ?

opportunity to see the majestic Great White Shark from the safety of a cage.

On the other side of Australia, a fringing

reef, called Ningaloo provides a magic and unspoilt dive destination. Fantastic coral gardens and walls not far from the mainland and snorkelling with whalesharks and manta rays are some of the highlights—as are spotting dugongs and dolphins.

There are plenty of wrecks to explore, caves to dive, off-shore islands to dream of, endangered animals, aggregation sites for rare species such as the Leopard sharks, the Grey Nurse Sharks, stingrays, cuttlefish and of course the annual coral spawning events.

About 89% of temperate fish species are unique to Australia, so there is no excuse not to come and visit the cooler regions.

This feature about Australia is aiming to go slightly beyond the “road well travelled” and includes some destinations that some divers might not yet have heard about. Australia is a fantastic place to live and dive—so, as they say down under, “Where the ‘bloody hell’ are ya?” ■

YANN SAINT-YVES



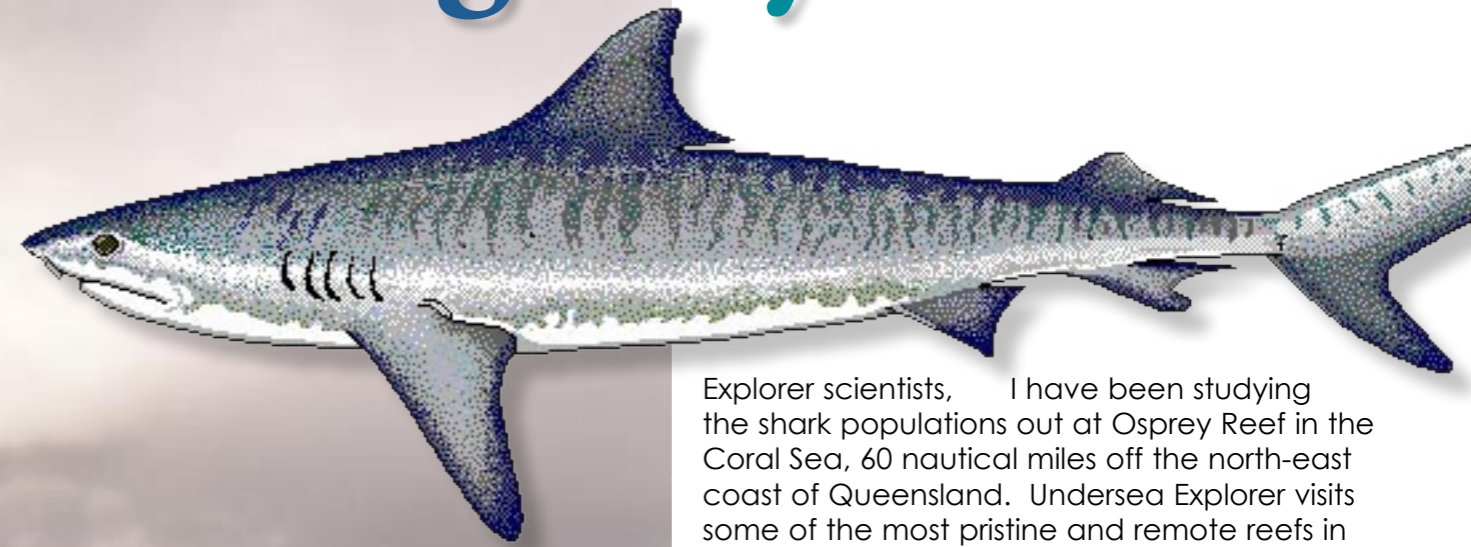
TOP: A pair of Nurse sharks, or Ragged tooth sharks, patrol the waters for prey. ABOVE INSET: Discover Aboriginal culture

SMALL INSET LEFT: Kangaroo X-ing LEFT: A view of Kata Tjuta from afar

YANN SAINT-YVES

YANN SAINT-YVES

Catch a Tiger by the Tail!



Explorer scientists, I have been studying the shark populations out at Osprey Reef in the Coral Sea, 60 nautical miles off the north-east coast of Queensland. Undersea Explorer visits some of the most pristine and remote reefs in Australia and provides a unique chance for tourists to do four dives a day whilst interacting with research scientists. Each week divers are able to join expeditions featuring projects on Sharks, Minke Whales, Nautilus, Coral Monitoring and Water Quality.

Osprey Reef

Osprey reef is an ideal dive site and a hot spot for sharks. White tip reef sharks, Grey Reef Sharks and Silver tips are guaranteed and hammer-

heads also seen regularly. To study the sharks here I need to insert a small id microchip underneath the skin, and for this I need to bring the shark up to the boat. This is easier said than done. Even the smaller sharks are incredibly powerful and quick, so I developed a technique of underwater shark rodeo! A crate of bait is placed on the reef and while the shark is preoccupied by the food, I grab hold of its tail and slip a rope around it. After that it is a gentle swim to the Undersea Explorer where we can do the necessary research with the aim of having real field data on growth, reproduction and home range of these sharks. Our goal is to obtain the information to work towards long term sustainability and conservation of sharks.



THIS PAGE: Researchers tag tiger sharks in Australian waters

Text by Richard Fitzpatrick
Photos by John Rumney

Hanging onto the dorsal fin of a tiger shark as it swims is a truly awesome experience. Feeling the immense power and strength of these animals is incredible.

Many people think I must have a death wish because tiger sharks are known to be pretty aggressive. I have stopped telling people what I do at social gatherings, it is a guaranteed conversation stopper. "What do you do?" "I tail rope sharks in the open ocean". People either think I am liar or a loony! I started off working with captive sharks

in aquariums around Australia but eventually left the aquarium world to move into underwater filming and to pursue my dream to do hands on research with wild sharks. I teamed up with a research and adventure diving venture Undersea Explorer to help establish a long-term shark monitoring program. For the last nine years, in conjunction with Undersea





Australian Tigers

How?

The first hurdle was 'How?' My initial idea was just to up scale the existing technique. After all tigers are just big reef sharks. The saving grace to capturing an animal of this strength and size is the bizarre way that sharks behave once their tails are secured. Nobody really knows why, but the minute the tail is caught they stop swimming and lie relatively placidly in the water.

However until the moment that that tail is secured the shark is far from placid! Grabbing the tail of a thrashing three and a half meter shark is pretty difficult, especially as the power of the shark turns the water to foam and visibility becomes almost nil. The only way I could get hold of the tail was by jumping in the water with the sharks. I managed to catch four tiger sharks like this, but it was pretty frightening. Seeing the gaping mouth of serrated teeth over

The Claw

After a year of development and testing I successfully used my new safer invention—The Shark Claw'. On the end of a long pole, the 'Claw' is designed to clamp on to the shark's tail. I attract the sharks using a floating bait. Approaching the bait in a small dive tender the tiger often comes over to investigate. The claw has to circle the peduncle in exactly the right place so timing has to be perfect. When we are close enough - I can grab the sharks tail using the 'Claw' without jumping in the water. The 'shark claw' is attached to a rope and large float which the shark drags through the water till it stops swimming. This new technique is much quicker and less stressful for both the animal and me.

Adam

The most recent tiger shark I have tagged was a 2.5 metre male, named 'Adam'. The satellite tag is attached to Adam's dorsal fin, where a salt water switch activates the tag every time the fin breaks the surface, allowing us to track her movements from space for months to come.

The satellite tags have revealed some fascinating new information about the lives of tiger sharks. We now know that they do cover huge distances after leav-

After working with smaller sharks for a few years I set myself a new challenge- working with the mighty tiger shark. Reef sharks are strong, but being the largest tropical predatory shark, tigers are a whole new ballgame!

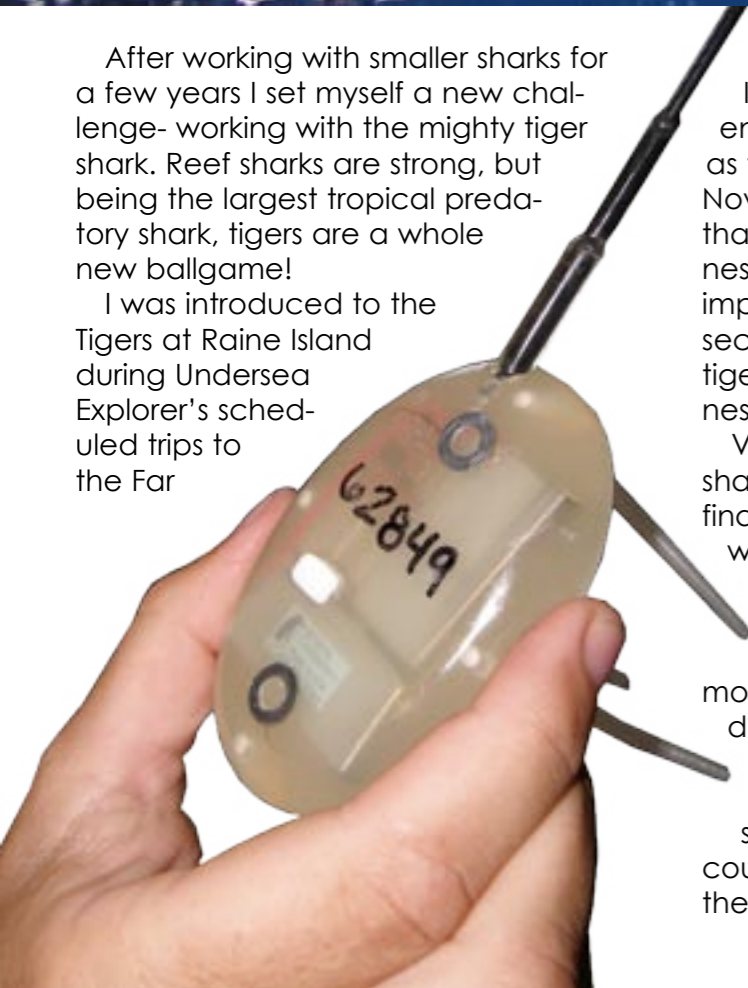
I was introduced to the Tigers at Raine Island during Undersea Explorer's scheduled trips to the Far

Northern Great Barrier Reef. Raine Island in the remote Far Northern end of the Great Barrier Reef is famous as the world's largest turtle rookery. In November it has been known for more than 14,000 turtles to come ashore to nest here in just one night. Raine Island's impressive turtle aggregations are no secret to marine predators like the tiger shark. As the turtles come in to nest, the tigers come in to feed.

Very little is known about tiger shark behaviour and I wanted to find out just how far the tiger sharks were travelling to feast on the migrating sea turtles at Raine Island. To do this I needed to be able to track the sharks' movements and the best way to do that is from space. I needed somehow to attach a satellite tag to the dorsal fin of tiger sharks at Raine Island so that I could follow them once they left the island.

two foot wide suddenly materializing just inches from your face is an image that is not easily forgotten.

Not surprisingly the scientific community eventually decided that this method was too dangerous and quietly encouraged me to look in to safer options.



Queensland



Of course everybody has heard of the Great Barrier Reef and its numerous drop offs, coral atolls and coves. The waters here are home to 1500 species of fish alone in addition to thousands of different molluscs, crustaceans and other invertebrates. Further out in the Coral Sea the waters are even more pristine with visibility often exceeding 50 metres. The islands that are located on the Southern Great Barrier Reef are all surrounded by colourful coral reefs, pinnacles and clear turquoise water. Sail and dive around the well-known Whitsunday Islands. When on land you can watch turtles laying eggs or turtle eggs hatch, depending on the time of the year. Further down on the Sunshine coast the newly sunk wreck of the *HMAS Brisbane* has become a big attraction to divers. Brisbane also offers artificial reefs in Morton Bay or make your way to Morton Island and dive some wrecks. Plus you will find that Manta Rays pay regular visits to North Stradbroke Island. ■



Australian Tigers



Leave this type of encounter to the pros. Don't try this at home!

ing Raine Island travelling in all directions. For shark management this kind of information is essential to match the most appropriate conservation plans with the behaviour of the species. For most large migratory species like sharks current marine parks only cover small sections of their habitat. The shark data

suggests that we must rethink and find more realistic methods to protect these ocean wanderers.

This research has been possible through the Undersea Explorer research program, Digital Dimensions, and CSIRO. To follow the shark research go to www.sharkresearch.com ■

Undersea Explorer Remote Far Northern Expedition – 7/8/9 day expeditions available Oct-Dec

Expeditions to Great Detached Reef, Raine Island, Mantis Reef and Wreck Bay near the top of Australia, with Richard Fitzpatrick as special guest scientist. Travelling to the Far Northern regions of the Great Barrier Reef will always be the pinnacle of extreme adventure diving. Australia's spring is the best time to dive the outer walls, offering a great chance of encounters with megafauna. Brydes Whales, Manta Rays and Whale Sharks and of course Tiger Sharks are all regular visitors to this region. Raine Island is the world's largest Green Turtle nesting site. During this expedition you'll experience the excitement of 3-4 superb dives per day in remote areas, drift dives and deep dives. Onboard activities range from informative presentations in the biologist room, 'creature feature' talks on the top deck, and barbecues on the top deck. Your panoramic flight to or from Lockhart River gives you the opportunity to view the vast wilderness of the Cape York coastline and reefs. In addition to our Far Northern Expeditions, Undersea Explorer also offers 6 day Osprey Reef Shark Encounters throughout the year, and 6 day Minke Whale Expeditions in Jun/Jul. Prices are from AU\$2100 per person for a 6 day expedition including twin share cabins and all meals. Check our schedule on the web: www.undersea.com.au/2007.htm or call 61 7 4099 5911

New South Wales



In the North, tropical and temperate currents meet and you can swim amongst Leopard Sharks in summer as well as loads of turtles, especially around Byron Bay. The critically endangered Grey Nurse Sharks, or Ragged Tooth sharks are resident in the southern part of the North Coast as well as further down the coast. Try the awesome cave dive at South West Rocks about half way down to Sydney. While there, don't just look at the opera house; Sydney's waters are surprisingly rich in marine life. Discover the rocky reefs and kelp beds teeming with life, such as Port Jackson sharks, Eastern Blue Groper, Giant Cuttlefish, Weedy Seadragons and moray eels. South of Sydney offers anything from penetrable shipwrecks to diving with inquisitive Australian Fur Seals. ■



YANN SAINT-YVES



TRURINA COOK - UNDERWATER.COM.AU



Byron Bay

Where Tropical And Temperate Waters Merge

By Wandy and Tim Hochgrebe
Photos and video by Tim Hochgrebe

The township of Byron Bay lies on the east coast of the Australian continent, a mere two hours south of Brisbane and about nine hours north of Sydney. Byron Bay is quite well known for being the most easterly point of the Australian mainland and is home to the most powerful lighthouse in the southern hemisphere.

Known for the alternative lifestyle and friendly people, Byron Bay has grown into one of Australia's most popular holiday destinations for people wanting something more than beach alone.

The many cafes and the relaxed atmosphere put you in a holiday mood right away. For those seeking culture, nightlife and fine dining, Byron also has a lot to offer. Art exhibitions, gallery openings, fire dancing performances and plenty of live music are always on offer.

People do not only visit Byron

Bay for its culture it also has some major natural attractions. One of them is the annual whale migration of the majestic Humpback Whale. Between May and October 5000 individuals make their way up North and back down to the Antarctica each year. Both land based whale watching and the close-up experience from boats has increased in popularity over the last few years.

Although Byron Bay is one of Australia's most popular holiday destinations, only few people realise the fantastic marine environment Byron Bay has to offer. This popular subtropical township renown for its beautiful beaches and stunning

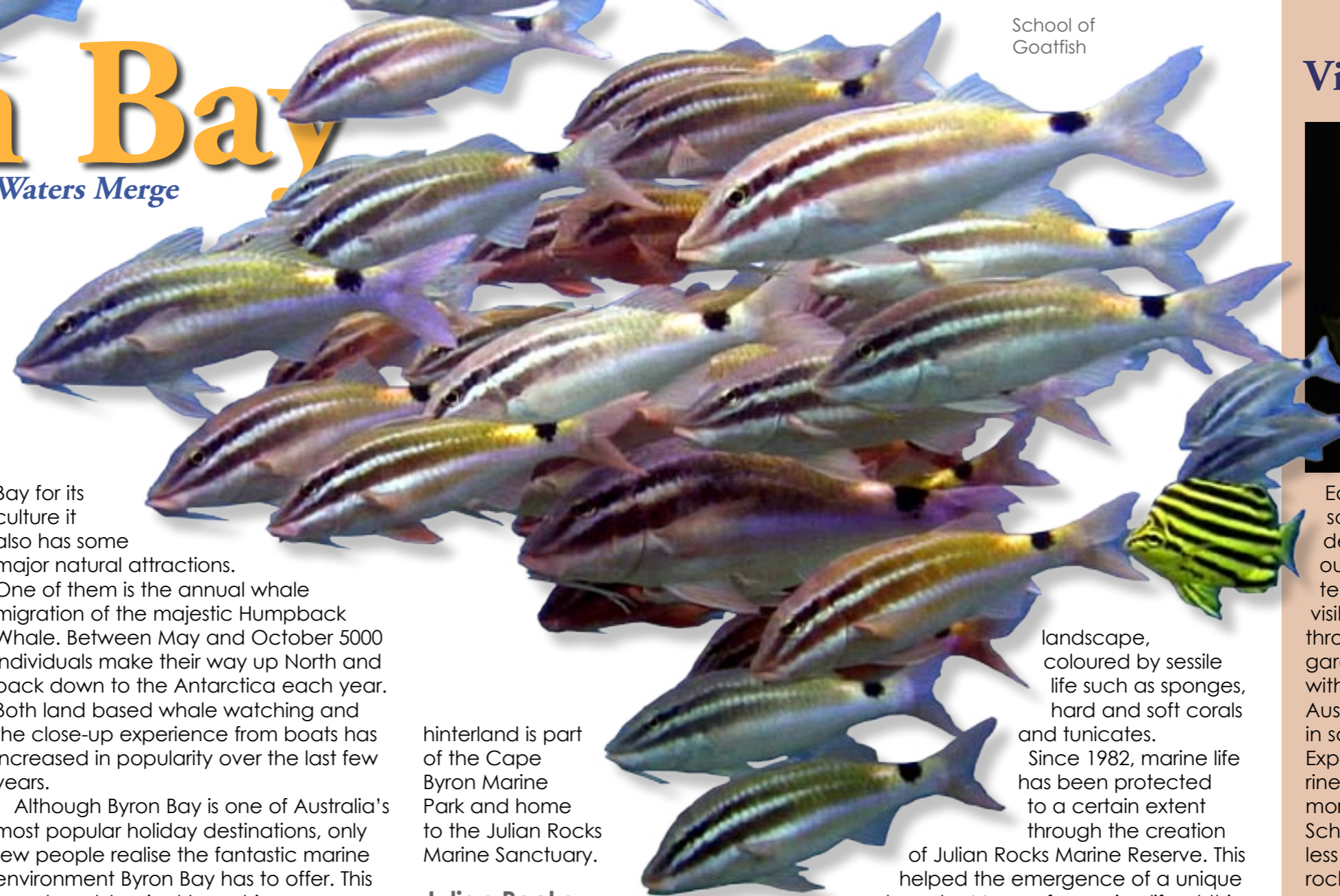
hinterland is part of the Cape Byron Marine Park and home to the Julian Rocks Marine Sanctuary.

Julian Rocks

Julian Rocks consists of ancient igneous rock, remains of a volcanic eruption more than 20 million years ago. It is an extension of Cape Byron separated by water and forms a most unique habitat, providing shelter and food for more than 500 tropical and temperate fish species alone.

Boulders, sand gutters and trenches form a fantastic underwater

School of Goatfish



landscape, coloured by sessile life such as sponges, hard and soft corals and tunicates.

Since 1982, marine life has been protected to a certain extent through the creation

of Julian Rocks Marine Reserve. This helped the emergence of a unique underwater Mecca for marine life at this rock formation only 2.5km off shore.

In December 2002 Julian Rocks became part of the Cape Byron Marine Park and in May 2006, the Marine Park zoning plan came into action, which amongst other things means that an area with a radius of 1500m around Julian Rocks has become a Sanctuary Zone for most of the year. This will hopefully see fish stocks increase even more and give the critically endangered Grey Nurse sharks, or Ragged Tooth sharks, some well deserved additional protection.

Even though Julian Rocks looks rather small, dive sites are plenty and its rocky reefs extend to Spot X, Mackerel Boulder and the Cape Pinnacles. Diving is pleasant all year round with temperatures ranging from 18° C in winter to 27° C in

Loggerhead sea turtle cruises the reef



Victoria



TONY BROWN - UNDERWATER.COM.AU

East of Melbourne. imagine a landscape made up from granite boulders, drop-offs and pinnacles, coloured by sessile growth. Yes, the water temperatures can drop to 12fC, but visibility can be up to 45 metres! Swim through kelp or past stunning sponge gardens. Melbourne itself is a big city with some great diving! Interact with Australian Fur Seals at the largest colony in southern Australia at Seal Rocks. Explore the wrecks of the J-Class submarines. West of Melbourne you find even more accessible shipwrecks. The Fiji, Schomberg and Loch Ard are located less than 10 metres deep. Explore the rocky reefs made up out of ledges, pinnacles and gutters, which are covered in sponges, zoanths, bryozoans and kelp. ■



FIONA LIGNUM - UNDERWATER.COM.AU





CLOCKWISE FROM TOP: Leopardshark displays dramatic markings and elegance in its streamlined form and fins; schooling reef fish; Brilliant red seastar

summer. Due to its sheltered location diving takes place almost every day of the year, with visibility ranging from 5 to 30 meters.

The marine environment around Byron Bay is quite unique as both tropical and temperate currents that flow past Julian Rocks contribute equally to the abundance and variety of marine life. With water temperatures and currents changing throughout the year there are many seasonal visitors. Every dive at Julian Rocks is different unlike diving on many coral reefs and many people return to this dive site on a very regular basis to experience it during different seasons and conditions.

Winter

The month of May, when water temperatures start to drop, marks the start of the Grey Nurse Shark season. These endangered and in NSW fully protected sharks are fantastic to encounter. Although these sharks look ferocious they are perfectly safe to dive with.

The Grey Nurse Sharks (*Carcharius taurus*), or Ragged Tooth Sharks, prefer the deeper waters and they

often congregate in the sandy gutters on the North side of Julian Rocks at a depth of around twenty meters.

Through the 1950s and 60s these sharks were hunted to near extinction in Australian waters as they were wrongly believed to be man-eaters. With their total population estimated to be less than 500 the Grey Nurse Shark population on the East Coast of Australia is now considered Critically Endangered. Fortunately, Julian Rocks has been identified as one of thirteen Critical Habitats for Grey Nurse



Sharks along the NSW coast. Some fishing and even dive behavioural guidelines were put in place in the hope this will increase the chance of survival of this species.

Spring

In spring when the water temperature starts rising, a variety of tropical species become more common around the rock and different kinds of butterfly fish, angelfish and surgeonfish dart around the coral outcrops that can

be found in different places.

The juvenile Half-circled Angelfish (*Pomacanthus semicirculatus*) can be easily identified due to its bright blue colouring and white semi-circles on the side. Once it becomes an adult the rings disappear, but they are still stunning. Of the Surgefish the Blue Tang (*Paracanthurus hepatus*) must be the most noticeable one and juveniles can be found hovering just above table corals together with Headband Humbugs (*Dascyllus reticulatus*), ducking inside for cover as soon as anything approaches.





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Byron Lighthouse was built in 1901

the most common ones being the Barrier Reef Anemonefish (*Amphiprion akindynos*) and the Blue-lip Anemonefish (*Amphiprion latezonatus*).

Around mid December the anemonefish start laying their bright orange eggs. Interestingly, the eggs are cared for mainly by the male, which can be found fanning the egg mass with their fins, providing its offspring with oxygen rich water. Hatching generally occurs after a period of 6 to 10 days.

It is at this time that the large stingrays arrive. Black Stingrays (*Dasyatis thetidis*), the Cowtail Stingray (*Pastinachus sephen*) and the Smooth Stingray (*Dasyatis brevicaudata*) can be seen on most dives. With their huge wingspan of almost two meters or more they are a quite impressive sight.

Summer

As the water temperature starts to reach its maximum in early January, Leopard Sharks (*Stegatosoma fasciatum*) aggregate at Julian Rocks.

Very little is known about these prehistoric looking and mysterious sharks. They mainly lie together in small groups on sandy patches and can be easily recognised by their

Butterflyfish

The butterflyfish are less shy and are found mostly in pairs, nipping on coral polyps or grazing. The Threadfin, Vagabond and Dusky Butterflyfish (*Chaetodon auriga*, *C. vagabundus* and *C. flavirostris*) are some of the species common at Julian Rocks. By the way, don't cross into the territory of the Girdled Scalyfin (*Parma unifasciata*) as those little farmers are fierce in protecting their algae patches.

Of course everybody knows the anemonefish, which live in symbiosis with their anemone. At Julian Rocks a number of different species can be encountered,



Byron Bay

Tasmania



ERITH ISLAND'S WEST COAST ANCHORAGE. PHOTO: GARY MYORS

ABOVE: Red Morwong. BELOW: Manta Ray



MAXI ECKES. UNDERWATER.COM.AU

aggregation sites each year.

As the water begins to cool in early May the Leopard Sharks simply disappear from Julian Rocks. Manta Rays visit Julian Rocks on occasion, however the end of summer and early autumn seems to be their preferred time of the year.

Other Sharks and Rays

The most commonly observed shark around Julian Rocks is the wobbegong shark. Three different species have now been identified and they are present all year round.

The Dwarf Ornate Wobbegong only grows to one metre and is the smallest species. It is observed regularly in the shallower waters, draped over a sponge or table coral. The larger Ornate Wobbegongs are not as common in this area

as the other two species. It has only just recently been decided that this is a separate species from the Dwarf Ornate Wobbegongs and they can grow up to

round forehead, pale skin with leopard-like spots and their characteristic tail.

Leopard sharks are egg-laying sharks, but no egg cases have ever been found near Julian Rocks. Much of the biology of the leopard shark is still unknown including where the individuals found at Julian Rocks go in winter and whether the same animals return to the few known

Around mid December the anemonefish start laying their bright orange eggs. Interestingly, the eggs are cared for mainly by the male, RIGHT: Frog, Planula



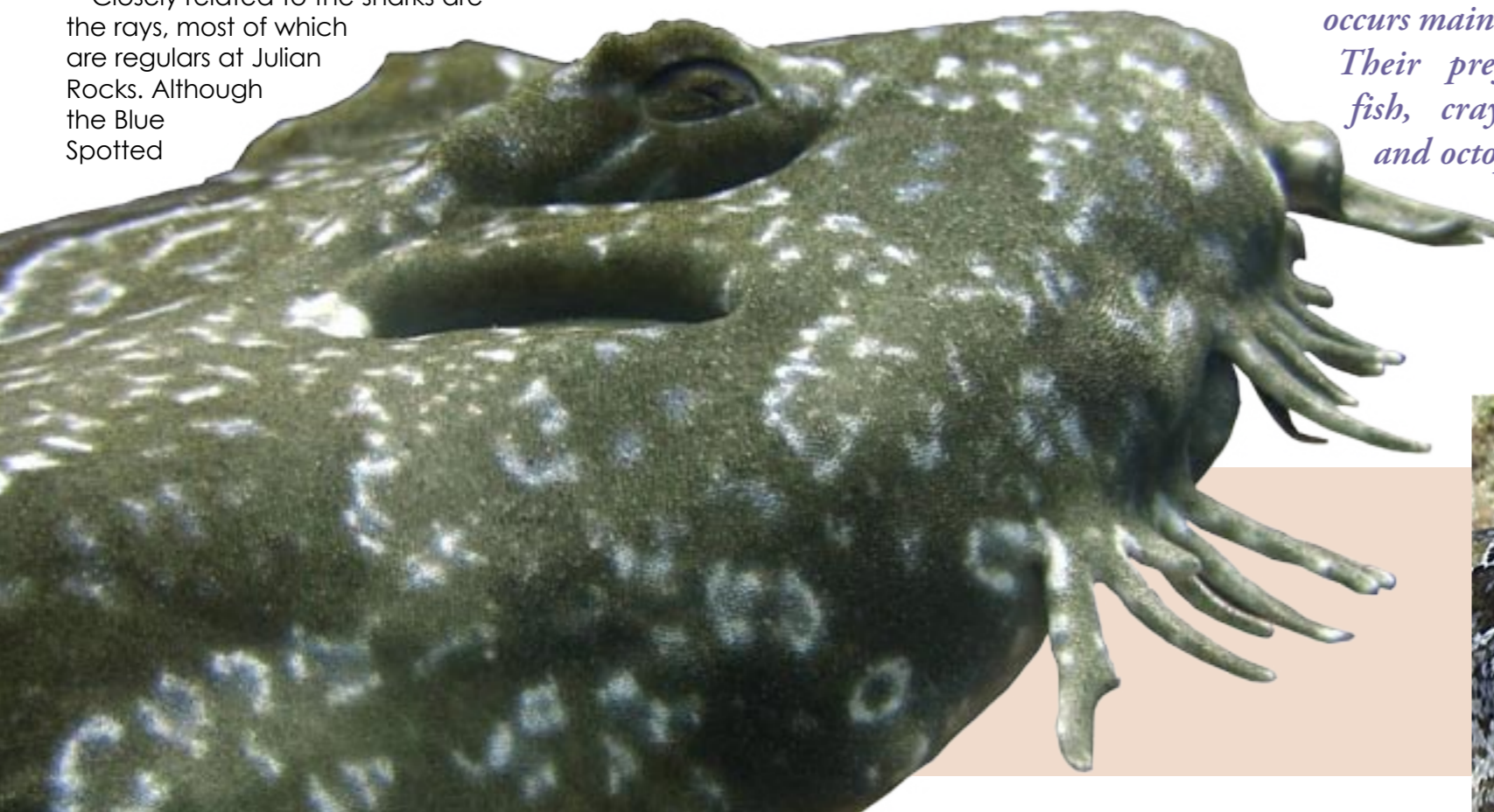


three metres in length.

The similar looking Spotted Wobbegong can be distinguished from the Ornate Wobbegongs by its colour patterns, which consist of broad dark saddles and the distinct circles formed of groupings of small white dots. Most of the time the wobbegongs lay at the bottom and feeding occurs mainly at night. Their prey includes fish, crayfish, crabs and octopus.

Closely related to the sharks are the rays, most of which are regulars at Julian Rocks. Although the Blue Spotted

Stingray (*Dasyatis kuhlii*) is believed to be a solitary species, these rays seem particularly active in summer and can be found in the shallows, piling on top of each other in the sand. Hundreds of Blue Spotted Stingrays can be observed in very tight groups in the same area, usually in early to mid January which could be interpreted as mating behaviour.



Numbray

Electric

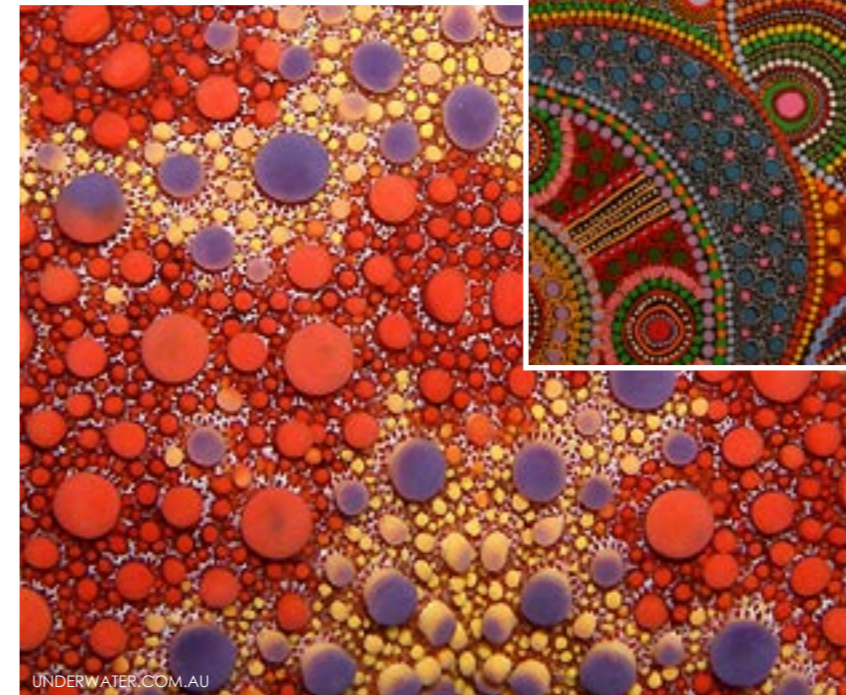
Another ray species seems to have found a meeting place at Julian Rocks as well. The Numbfish (*Hypnos monopterygium*), also called Electric Ray, becomes visible in higher numbers during the beginning of autumn in March. Normally they bury themselves in the sand and wait for their prey to swim past, but during this time they actively swim around in the shallows. This behaviour has been observed during the same weeks of the year for many years at Julian Rocks and has not been reported elsewhere.

These odd-looking rays have specialized muscles located on their back which can generate a significant electric current (50 amps, with peak of pulses sometimes exceeding 1 kilowatt). Not only does the Numbfish use this to stun their prey; it can also seriously deter any predators.

Julian Rocks' reefs are also home to the White-spotted Eagle Rays (*Aetobatus narinari*), the Sparsely Spotted Stingaree (*Urolophus paucimaculatus*), the Eastern Fiddler Ray (*Trygonorrhina fasciata*), the Eastern Shovelnose Ray (*Apytychotrema rostrata*), the Giant Guitarfish (*Rhynchobatus djiddensis*) and very occasionally the Southern Eagle Ray

Most of the time the wobbegongs lay at the bottom and feeding occurs mainly at night. Their prey includes fish, crayfish, crabs and octopus.

Byron Bay



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Art resembles nature or nature resembles art... ABOVE: Traditional dot on dot technique used by Aboriginal artists to create vibrant designs. LEFT: Close up of a seastar BELOW: Diver greets Leopardshark. (image from Fido Reef) BOTTOM IMAGES: Wobbegongs

(*Myliobatis australis*). And if you are very lucky you can witness spectacular schools of up to 200 Cow-nose Rays (*Rhinoptera neglecta*) that sometimes pass by Julian Rocks.

Marine Turtles

One of the big attractions when visiting Julian Rocks must be the friendly sea turtles that live here. Julian Rocks is home to three different species: the Green Turtle (*Chelonia mydas*), the loggerhead turtle (*Caretta caretta*) and the Hawksbill Turtle (*Eretmochelys imbricata*).

All three marine turtle species are



STEVE GRIFFI - HTTP://WWW.

currently experiencing serious threats to their survival.

Not many people know that adult Green Turtles are unique among sea turtles in



travel

that they have a completely vegetarian diet and feed on seagrasses and algae, whereas Hawksbill Turtles feed mainly on invertebrates like sea squirts and anemones.

Most divers know that Loggerhead Turtles can reach enormous sizes. One very large Loggerhead seems to call Julian Rocks its home. Its size indicates that it must have been around for a long time! The lifespan of a Loggerhead turtle is estimated to be 50 years or more and adults grow to an average weight of about 100 kilos. Equipped with powerful jaws they can crush crabs and molluscs and even the spines of a sea urchin are no defence.

Even though turtles are very much at home underwater they are in fact reptiles and need to go the surface to breathe. During resting periods they can stay submerged for long periods of time. If they become more active they will need to return to the surface more often—which is why turtles are very commonly seen by snorkellers. Julian

Rocks therefore not only attracts divers, many people that have never ever snorkelled in their life come out here to swim and snorkel with turtles... and some of them will turn into divers eventually

Cephalopods

The rocky reef provides an ideal habitat for many Cephalopods—literally meaning head-footers—which include octopus, cuttlefish and squid.

Several species of octopus have been sighted on the reefs around Julian Rocks. Generally shy creatures these invertebrates prefer to crawl into their burrow when they feel threatened, holding shell fragments and rubble in front of them.

The cuttlefish around Julian Rocks can be found hovering just above the ocean floor, and usually move around in pairs

When cuttlefish feel threatened they initially might try to blend in with their surroundings and almost disappear from sight. They are true masters of camouflage. If approached too



Blue Groper

close for comfort they will try to make themselves look as large as possible by extending their arms and rapidly flashing colours are displayed often as a warning.

Another member of the cephalopods, the squid, is seen around Julian Rocks only occasionally.

Like the other cephalopods they use a specialised foot called a siphon, which enables them to hunt and escape quickly by expelling water under pressure.

Pelagics and Predators

Marine life does not only come to find shelter at Julian Rocks, food is abundant here attracting schools of streamlined predators. Pelagic hunters such as Mullet (Argyrosomus japonicus) and Yellowtail Kingfish (Seriola lalandi) are fast swimmers that can be found regularly in the deeper waters around Julian Rocks. Other pelagics include Big-eye Trevally or Jacks, as well as Golden and Blue-fin Trevally.

Occasionally barracudas pay a visit to the rocky reefs and can be seen in small schools out in the blue.

Hunting closer to the reef are the spectacular lionfish.

Several species are observed in this area including the Common Lionfish (*Pterois volitans*), the Dwarf Lionfish (*Dendrochirus brachypterus*) and the Spottin Lionfish (*Pterois antennata*). It is common diver knowledge that Lionfish have extremely venomous dorsal fin spines, but they are generally not dangerous to approach.



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Detail of a sea anemone

Dusky Flathead

Lionfish prey on a wide variety of smaller fishes, shrimps and crabs. They have few predators in their native range. Their prey, which is hunted mainly at night is obtained with a lightning quick snap of the jaws and swallowed whole.

Several species of moray can be found at Julian Rocks, including the Abbot's Moray (*Gymnothorax eurostus*), the White-eyed Moray (*Siderea thyrsoides*), the Green Moray (*Gymnothorax prasinus*), the Mosaic Moray (*Enchelycore ramosa*) and the Sieve-pattern Moray (*Gymnothorax cribroris*). Moray eels can look quite

fearsome, as their mouths are equipped with razor sharp teeth. The wide open jaws are generally not a sign of aggression, the gape is necessary for respiration as water has to be actively pumped across the gills. During the day most morays are found in crevices and holes affording protection from predators and allowing them to strike at prey from a hidden position.

Besides the animals mentioned already there is plenty more to see such as the playful Blue Gropers, bullseyes, fusiliers, Old Wives, Harlequin Ghost Pipefish, Pine-

applefish hiding under ledges, Sergeant Majors, Barred Soapfish, cowry shells, a variety of brightly coloured nudibranchs, and plenty of other

molluscs, crayfish and an array of smaller crustaceans. Sometimes there are so many fish you can hardly see where you are going.

Byron Bay and Julian Rocks offer a unique environment that celebrates and nurtures diversity, abundance and colour and is considered one of Australia's top 10 dive sites – and of course our number ONE.

In addition to the amazing wildlife that can be encountered at Julian Rocks, this diving site also has the advantage that it is only a short boat ride from the shore. You can do up to four dives a day, but it is also possible to do just one or two; leaving plenty of time to relax and enjoy Byron Bay or explore the surrounding national parks and villages.

Diving is done on a small scale and there are only two dive shops in town, which ensures that the dive sites are never crowded

Getting there

Apart from the obvious driving there, there are two airports nearby: one at Ballina (20 minutes south) and one at Coolangatta - Gold Coast (40 minutes north). Regular flights from all Australian capitals and some international flights into Coolangatta. Shuttle busses from Brisbane airport for those from further afield. ■

YANN SAINT-YVES



Thorny Devil, *Moloch horridus*



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Red Indianfish



South Australia



BRENTON DEAN

Time to chill at Bondi Beach Sydney Harbour

Text by Richard Vevers and photos by George Evatt

Diving in Sydney is like drinking beer, it can take a while to get used to but once you get the taste for it, you're hooked for life. It can be cold, it can have poor clarity, but you'll be hard pushed to find anywhere in the world with such great diving a stones through from your office in the city.

Australia is renowned for its tropical diving: seeing Nemo on the Great Barrier Reef, schools of sharks in the Coral Sea, manta rays and the majestic whale shark on Ningaloo Reef, so it is not surprising that the diving in cooler waters goes largely unnoticed. Especially diving in a major city, which is rarely a priority for divers.

Yet the temperate waters of Australia boast one of the most diverse marine ecosystems in the world—an amazing underwater world that few ever explore—Sydney is at its heart. There are

over twice as many species in the harbour within sight of its famous Harbour than in the entire British Isles.

The secret behind Sydney's, marine life is its proximity to the continental shelf, bringing with it nutrient rich water and a vast array of visitors including several tropical species caught up in the East Australian Current coming down from the Great Barrier Reef.



Bondi Beach epitomises the diving in Sydney. Visited by millions of people each year, it is arguably the world's most famous beach. A

beautiful surfing beach, within 15 minutes of the city centre, it is home to the oldest surf lifesaving club in the world. However, despite its high profile, only a handful of people ever check out what lies beneath the waves.

Bondi Beach has become world famous as a surfing beach because

of its accessibility, so why isn't its diving equally famous? It certainly has the marine life to justify it. A typical example is the Weedy Seadragon—one of the world's most amazing creatures. Growing up to 45cm, it is related to the seahorse, but as its name suggests, it looks like a dragon, complete with blue stripes and yellow spots. How can a dragon living on the world's most famous beach not be famous itself? The fact is, even the majority of locals don't know it exists. In virtually any other country, everyone would be aware of this beautiful creature, but Australia is so spoilt with incredible wildlife that it gets ignored.

Despite their bizarre appearance, Weedy Seadragons are actually pretty difficult to spot. There are only about 20 at Bondi Beach and they blend in perfectly with the kelp—which seems completely ridiculous after you spot one and then consider how brightly coloured they are.

Even if you don't get to see the Weedy Seadragon on a dive at Bondi, there's no shortage of other bizarre life to look at. The giant cuttlefish is a favourite. Its ability to change shape and colour in an instant is impressive on its smaller cousins, but when you are faced with a group of cuttlefish all over a metre in length, imitating their sur-



The area west of Adelaide is well known for the appearance of the magnificent Great White Shark, King of the Sea, Predator Extraordinaire. This experience is not for the fainthearted or the impatient. Luckily, there are other sites to safely dive amongst encrusted pylons, rocky reefs and sponge gardens, harbouring cephalopods, seahorses, spidercrabs, the Leafy Seadragons and soft corals. Visit Whyalla where huge numbers of the Giant Cuttlefish aggregate to mate and spawn. Just off Adelaide discover history and dive the *HMAS Hobart*, which now lies upright at a depth of 30 metres. Kangaroo Island, just off shore from Adelaide, offers plenty of opportunity to find the Leafy Seadragon. In the state's east, discover diving with a difference and plunge into the fresh water lakes, sinkholes, cave and caverns at Mount Gambier. Besides the thrill there is also some life in the crystal clear lakes such as yabbies, eels, lobsters, and pygmy perch. ■



RON WALSH - UNDERWATER.COM.AU

CLOCKWISE: Polyp, Diver spots red coral, Mosaic Leatherjacket, Sydney Opera. INSET: Old Wives





Bondi Beach



JOHN NATOLI

CLOCKWISE FROM FAR LEFT: Sydney Bridge; Anemonefish guarding anemone; Stargazer; Sydney Opera House at night



IAN PENFORD - UNDERWATER.COM.AU

roundings as the swell takes them from sand to rock, the image is mesmerizing.

The Wobbegong, a three-metre Carpet shark, aptly named for its ability to look and act like a kitch 1970 carpet is another local favourite. It lies on the bottom motionless until an unsuspecting diver swims too close and is shocked to suddenly see the seafloor bust into action.

Other marine life seen regularly at Bondi Beach include piles of a dozen or more Port Jackson sharks having their afternoon siesta (a shark that can't bite you but can give you a nasty sting from its horn), large bull rays, fiddler rays, octopus, schools of squid and the large sex-changing, bright blue grouper that follows you around like a puppy. Then there are the balls of stripped catfish that you can swim through (if you dare—their poison never leaves your body if stung), the large schools of salmon tuna and kingfish that form a perfect barrel around divers, brightly coloured nudibranchs, big red stonefish... the list goes on. They all live a few hundred metres from the 35,000 oblivious topless sun-worshippers on this famous

strip of sand.

However, Bondi is not even considered the best shore dive site in Sydney—there are many other contenders. The more popular sites include Shelly Beach and Fairlight in the northern beaches, Camp Cove and Gordon's Bay on the eastern harbour foreshores, Bare Island—a small island on the northern foreshore of Botany Bay—and Shiprock, in Port Hacking.

Manly, the other great surfing beach of Sydney, like Bondi is also typical of Sydney's amazing marine life. Ten metres off the crowded harbour beach, in three metres of water, lives a colony of 200 seahorses on the

man-made shark nets. Tell anyone on the beach about them and they'll think you're crazy.

Bare Island is a personal favourite—one of the most scenic shore dives. It has many of the same species as Bondi but with a few stunning additions including the red indian fish that looks exactly like a red indian chief and the elusive blue devil fish that never ceases to amaze divers. They live in a surreal landscape consisting of bright orange and pink sponge.

Although the shore diving is excellent, sometimes it is great to get on one of the dive boats in Sydney and get out to some of the other dive sites. Almost all of the 30 odd dive facilities either own, or have on permanent charter, a dive boat—capable of carrying anywhere between six to twelve divers. Whales and dolphins are regular visitors to Sydney and frequently appear alongside dive boats and even the occasional giant sunfish makes a trip in close to shore.

One of the most popular boat dive sites is Magic Point—a fabulous dive that starts off at a large amphitheatre with an overhang that goes back under the cliff. This is where the endangered Grey Nurse Sharks cruise by. There are only approxi-

mately 500 of these sharks left in Australia and you feel very privileged to be able to get up close and personal to these harmless rare large sharks.

Sydney is the oldest settled city in Australia and its coastline and waterways are littered with wrecks of every description; some the result of maritime misfortune and others that have been purposely scuttled. In Sydney Harbour alone there are more than twenty-five known wrecks and offshore there are an even greater number. Although many of these vessels lie in water depths only accessible to technical divers, others are in shallower waters just metres from shore.

One of the most popular is the *Coolooli*—a large wreck scuttled off Long Reef. An old bucket dredge that now lies on her side on a sand bed in 48 metres off long reef. This dive has something for everyone and begins at 36 metres. The wrecks superstructure is intact and it is possible to penetrate various areas. For the more adventurous,

you can swim through the funnel and come out through a hole in its side.

Diving in Sydney surprises virtually everyone. Once you get used to the colder water (16 to 24°C) and the lower visibility than the tropical diving up north, you'll find the experience unique. The sheer diversity of life in the temperate waters means that there are always new things to discover. In fact, despite being in a major city, even in the harbour there are new species waiting to be discovered and named.

For more information, please contact Richard Vevers at: www.underwateraustralia.com.au ■



Frogfish



Tasmania Bound For Adventure

Text by Gary Myers
Photos by Baron and Gary Myers
and Karen Gowlett-Holmes

One look at the prognostic weather chart told me that we would not sail on schedule. The forecast was for 30 knot north-westerlies with gusts to 45 knots throughout the night and for the next 24 hours.

Our destination, the Kent Group of islands, was north west of our departure point, Inspection Head at the mouth of the Tamar River in northern Tasmania. The vessel of the brigantine *Windeward Bound* had taken aboard a motley crew organized by Christian Bell, the Tasmanian Co-ordinator of the Marine and Coastal Community Network. We had eight divers out of a full complement

We threw off the lines late the next afternoon and motored to the mouth of the Tamar and into Bass Strait. The wind was still a gusty 25 knots from the North West but was forecast to swing west, then South West hopefully giving us ideal sailing conditions early next day. We were divided into groups under the supervision of the experienced crew to stand watch during the journey. Many of the new crew and some of the old fell victim to the poor sea conditions, which the skipper Brian Parry-Adams rated, by chunder factor. My watch was the middle watch from midnight to 0400 and it was an experience that I'll remember forever.

The moon was nearly full and on the bow, bathing the ship and the heaving sea in silver light for all of my four hours at the helm on the opened quarter deck. The clear cold sky and the fresh wind that combined with the natural light show made standing at the helm pass rapidly. I became aware for the first time in many years of just how insignificant we are when nature chooses to display her charms. All too soon it was time to crawl back into my warm bunk and catch some sleep.

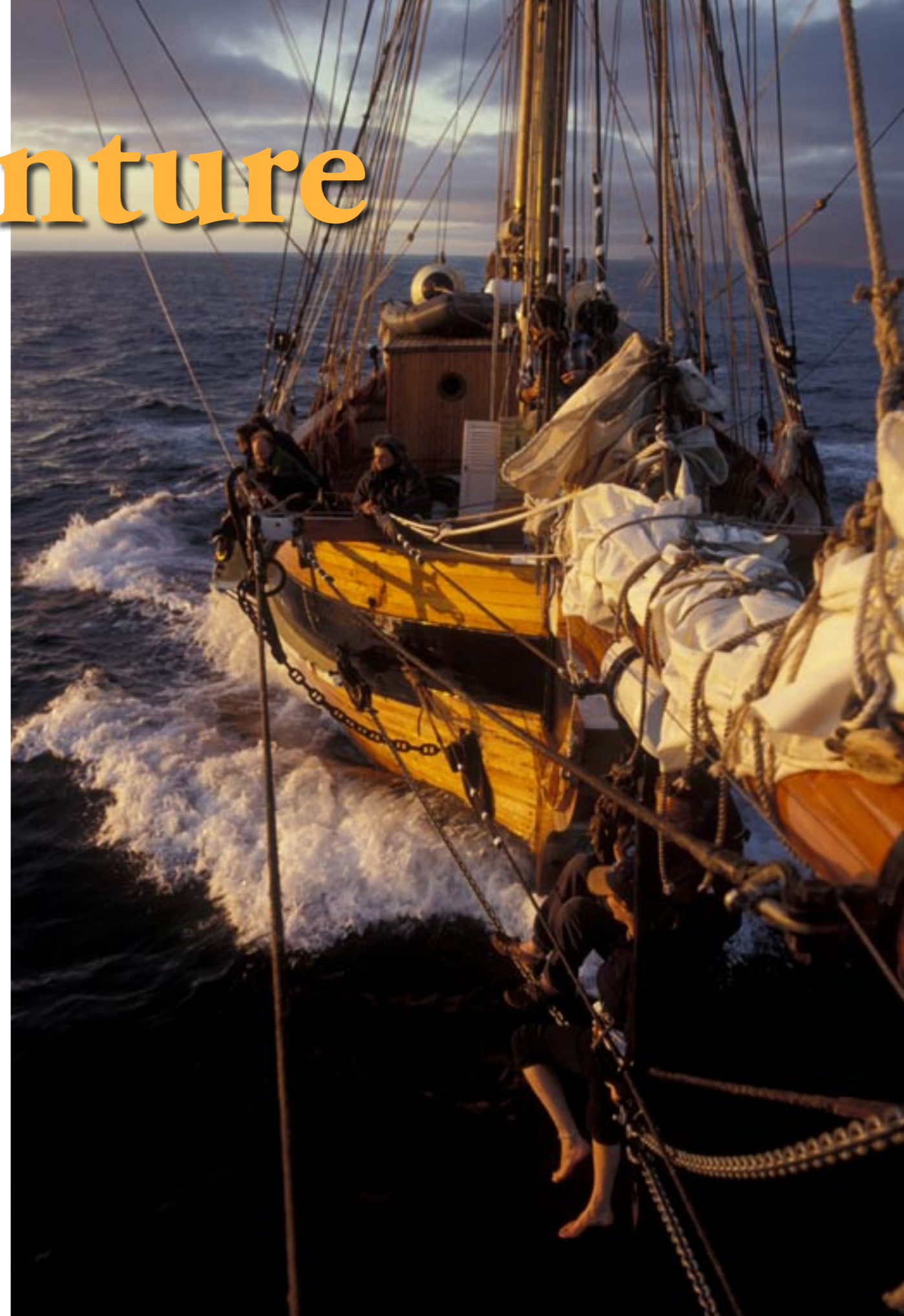
Several hours later, I re-emerged to find the wind had changed and the square sails had been set creating a new feeling to replace the magic of the wild night with a superb morning with ideal sailing conditions. Several of those who



Nudibranch graces the dark coral reef
LEFT: Traveling to the Kent Group Marine Reserve the old world way aboard the wooden brigantine *Windeward Bound*

of twenty four, twenty five if you counted Oscar the ships dog.

The aim of the voyage from my point of view was to video and photograph as much of the marine life and historic ship wrecks as possible to help with the creation of the Kent Group Marine Reserve.





Engraving of the SS Bulli in its glory days

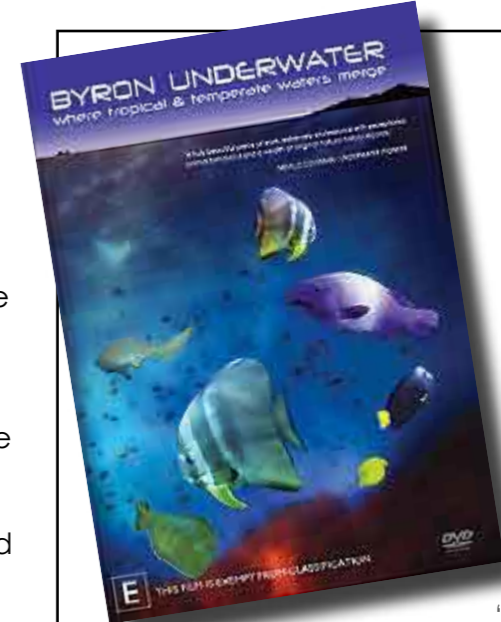
to make an effort in case the weather deteriorated in coming days. We had two small inflatables aboard and we assembled the smaller of the two first. It was able to deliver us one at a time onto the wreck, which sits upright on a sandy bottom in about 17 metres of water.

The SS Bulli laden with coal and bound for Launceston had taken shelter from heavy southerly weather on the afternoon of the 28th June 1877. The weather cleared that evening and the master of the vessel recommenced his journey.

Tasmania

Unfortunately, the vessel struck rocks near NE Island and was forced to return to West Cove. The crew tried to save the ship by throwing the cargo overboard this however failed and the ship was abandoned. The crew of 26 landed on Erith Island and later with the help of the lighthouse keeper, signaled a passing New Zealand steamship the SS Tararua which rescued the crew and transported them to Melbourne.

The wreck is marked on all current charts and being 180 feet (54 metres)



'Byron Underwater' video by Tim Hochgrebe is available at www.underwater.com.au

Filmed by Tim Hochgrebe
 Edited by Andrew Bambach
 Directed and produced by PLANULA and In Your Face Productions
 Soundtrack by Simon Perroni (former DO3) and Bhakta. Release date: 10 December 2006. DVD: 58 minutes, full narration, multi region PAL format

Take a marine journey through the seasons of Byron Bay to encounter an amazing kaleidoscope of life with the latest DVD release from Planula Productions and In Your Face Productions. Byron Bay is unique and renowned for its incredible diversity and abundance of marine life caused by its water temperatures and currents changing throughout the year.

On the reel, you'll see mating octopus, hunting wobbegongs, massive schools of pelagic fish such as kingfish, mulloways and trevallies. Nature celebrates in astonishing abundance of life at Julian Rocks where tropical and temperate currents converge, to form this unique environment. Over 1000 dives and hundreds of hours of film over six years went into this production.

The DVD 'Byron Underwater - where tropical and temperate waters merge' is now available at www.underwater.com.au FREE SHIPPING WORLDWIDE offer good from now until the official release date above. Extra features: Byron Underwater—a musical journey, Cape Byron Marine Park zoning plan, Marine Passions DVD trailer. ■



LEFT: Amphipod



ABOVE: Erith Island's West Cove anchorage



LEFT INSET: View of the stern of the wreck of the SS Bulli

hadn't been able to crawl from their bunks to take turn on watch began to appear green faced into the fresh air as the weather mellowed and our destination materialized on the horizon. Almost 24 hours to the minute since departing Inspection Head, the anchor plunged through the glassy surface of West Cove on Erith Island.

Steamship Bulli

This vantage point was most suitable from my point of view as the wreck of the steamship Bulli was only 50 metres from us and although almost sunset Mick Baron, Graham Collins and I decided to gear up and go for it. My theory was that we were already one full day behind and needed





Shipwreck of the *Karitane*

long is easy to locate as its shape is visible from the surface. The current in the area is strong and inexperienced divers should be supervised carefully. The ship is extremely photogenic; the stern makes a wonderful silhouette. The interior forward of the boilers

is stunning with some of the most colorful invertebrate life in the region. I did three dives on the *Bulli* and still didn't get all the video footage I would have liked. The next morning, Mick and I decided to dive on the southwest corner of Deal



Tasmania

Island near a place we called Indian Head. This was a deep wall dive that took us to 35 metres. It was another of those dives that, should the chance arise, I would not hesitate to repeat. Clouds of Butterfly Perch swarmed around us almost blocking out the sun on some occasions. Several Old Wives, a big bull seal and spectacular invertebrate life kept us spellbound for nearly 40 minutes. Our fear of being swept away in the current that passes through Murray Passage was unfounded although

The *SS Karitane* was bound for Port Kembla and Sydney in December 1921. She carried copper ingots from Mount Lyell mine, timber from Burnie and produce from Devonport. While steaming across Bass Strait, she encountered thick fog and crashed into the rocky headland on the southeast corner of Deal Island. Captain Spain assessed the damage and chose to beach the vessel in Squally Cove about two miles from where she first struck.



ABOVE: Strange forms of a Ctenophor
LEFT: Schooling fish hover over a garden of sponges and corals

Stuart Lennox, our boat watch, had trouble finding us. Eventually, we were retrieved and returned to the ship none the worse for wear.

SS Karitane

Thursday's plan was diving another historic ship wreck, the 1,376 ton *SS Karitane*.

We moved the *Windeward Bound* to Squally Cove on the south side of Deal Island and located the wreck easily, as part of the bow is visible on the shore. Originally 247 feet (73m) in length, the remains of the ship lies with the stern in 12 to 15 metres of water and can be seen easily from the surface of the clear water. Unfortunately, the vessel was



The fantastic fronds of a Lionsmane jellyfish

blown to bits by the enthusiastic salvors led by the Johnno Johnstone (of *Niagra Gold* fame). The ship has very little in the way of artifacts as it has had a pretty good going over since 1921 and is shallow enough to allow snorkellers to dive most of it easily. From the boilers to the stern is the most photogenic area with the stern laying starboard side down on a sandy bottom. If you want good photos, warn the other divers to stay off the bottom as the sand stirs up very quickly.

This is a dive for all levels of diver if there is no swell. Just remember that the weather can change very quickly and make returning to a safe anchorage difficult. The fish life around the wreck was inspirational and includes species that are not found further south plus many others that are not found further north. It



The crew of the *Windward Bound* enjoy a moment over the waves

was a real mixing pot and offered many great photo and video opportunities.

Owing to a later than normal first dive and the necessity to move the *Windward Bound* back to West Cove

on Erith Island, four of us elected to do a night dive in the sea grass bed near the anchorage. For me, this was a disaster of a dive with first my video light failing, then my video battery going flat. There

Tasmania

were many interesting night critters to see and just having the lights and camera strobes firing made the whole scene seem like something out of the X-Files. At one stage, while under the ship, I noticed that the mast head and deck lights cast a silhouette of the whole ship onto the sandy bottom. The masts and people walking on deck cast their shimmering ghost-like shadows down through the clear mill pond calm water. It was a dream like feeling as we sank towards the bottom and focused on the job of finding the small creatures of the night.

Port Jackson shark

I rose early on Friday to see and photograph the sunrise and wasn't disappointed by the dazzling light show provided by the location and the vessel. The main dive of the day was to be another deep one this time on the north-east side of Erith Island, which was more or less just around the corner from where our ship lay.

This was another awesome dive Mick and I followed the almost barren bottom down to 33 metres and along the sand edge into a world of brilliantly colored encrusting corals, sponges and thousands



Free swimming anemones

of fish. All too soon we had to leave this amazing dive site and head up into reality for a deco and safety stop. This was

not as bad as it sounds as far as deco stops go as the fish life, including a good size Port Jackson Shark, kept us occupied



Gary Myers with Port Jackson shark





A carpet of golden Zoanthids bloom on red sponge

Graceful pink jellyfish dances in the deep



KAREN GOWLETT-HOLMES

for the remainder of our dive.

This was our last night at Erith Island and first light on Saturday morning saw us circumnavigating Deal Island to catch the beautiful soft morning light on the eastern side of the island. Then off to the west to Judgement Rock seal colony. While most of the divers had a swim with the seals, I shot some top-side footage from the rubber duck and Mick did the diving. Then

it was back to the business of heading home. The return trip overnight to the mouth of the Tamar River was uneventful and very pleasant if not a little sad. We had made some very strong friendships, done some world class diving, and had a week the likes of which usually happen only in adventure documentaries.

New Marine Reserve

As a result of the work done



on this expedition and following work by Christian Bell from MCCN the Tasmanian Government made the announcement in 2005 declaring the Kent Group of Islands a Tasmanian marine reserve.

It is our hope that we will return to Bass Strait to continue the saga and broaden our knowledge of the dive sites in this magnificent group of islands. ■

A garden of sponges and soft corals decorates the reef

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INCLUDED





Western Australia

Text and photos by Paul and Kelly Wags

CLOCKWISE FROM LEFT: Tail end of the whaleshark; Divers try to keep up with a whaleshark; Underwater photographer encounters schooling fish; The ubiquitous emu in the desert

Divers the world over can be divided into two groups, those who would like to visit Exmouth and Ningaloo Reef and those who would like to go back there. Of course, this could be said of hundreds of highly promoted, well managed tropical diving destinations offering resort facilities, reliable diving conditions and top notch service, and herein lays the difference. Exmouth is remote, facilities are basic and conditions are unpredictable, however the marine life is abundant, the reef is highly accessible and the area is largely pristine. Ningaloo Reef is a place where divers can experience a diverse range of depths, marine life, topography and visibility and patronise genuinely local operators who can custom-

ize diving packages based on experience, budget and seasonal diving conditions. Exmouth is not a place where divers can expect exciting nightlife, shopping or a large selection of restaurants. The allure lays in the rich, natural resources of the region, which are currently under consideration for World Heritage Listing, most significantly Ningaloo Reef!



Ningaloo

Traditionally Ningaloo Reef has been referred to as having a 'season', being somewhere between April and July. This is largely due to the desire of many visitors to coincide their visit with the presence of Whale Sharks which visit Ningaloo to feed during these months. The weather during this period is generally considered milder and more bearable, particularly for European travellers who find the 40°C days, common through the summer months, unbearable. However, the preference for the 'season' is becoming less obvious as more visitors arrive to take advantage of the less busy months, where the chance

for a beach or dive site to oneself becomes more likely. Diving is great all year round, as long as divers are prepared to be flexible and make choices based on conditions and local knowledge provided by local operators and internet weather forecasts. The word is also out that whale sharks aren't the only reliable 'big' animal at Ningaloo.

Options for diving Ningaloo Reef from Exmouth span several locations. Not all can be dived at all times of the year and are heavily dependent on wind, swell, currents and tides, all of which the Ningaloo Reef are at the mercy of. However, due to Exmouth's location of the North West Cape peninsula, at least



The Ningaloo calendar

November- January:

Turtles mating in the Shallows and nesting in the evenings. Sharks mating and nursing in shallows. (Good diving unless cyclone)

February- March:

Baby turtles hatching, baby sharks in shallows. (Good Diving unless cyclone)

March- July:

Whale Sharks on West Coast

June- July:

Manta Rays feeding/ cleaning on West Coast

June- August:

Humpback Whales West Coast

August- November:

Humpbacks in Gulf

Pilot Whales, Minke Whales, dolphins, dugongs, manta rays, orcas and other 'big' animals appear sporadically throughout the year to the delight of divers and crew- anything can happen on Ningaloo Reef!

one side is partially protected from the prevailing conditions. In a perfect world, divers could visit each location during their stay, but the reality is that their money



Ningaloo Reef



and time underwater are better spent by working with the conditions. This may well be the reason divers come back time and time again, in the hope that the Indian Ocean will allow them access to visit a different, wondrous part of Ningaloo Reef of each visit. And given time it will...

The following is a brief description of each of the areas of Ningaloo Reef accessible to divers from Exmouth. Unfortunately, even if conditions are conducive to diving the more remote areas, often operators won't deviate from their local

'cattle truck run' due to expenses, logistics and time. However, the discerning diver with a few Aussie dollars to play with will always find an operator willing to negotiate a private, customised charter.

Lighthouse Bay Referred to as 'Local Reef Diving' by operators, is a 30 min boat trip from the boat ramp at Bundegi Beach. This is considered the 'bread and butter' diving of Exmouth due to close proximity, reliable marine life sightings, numerous dive sites, and shallow depths. Dive sites include 'Blizzard Ridge', the Labyrinth, Gulliver's, Eldorado's and the Fish Hole. These are huge limestone outcrops, which appear like oases in the sand, attracting thousands of fish of all sizes and regular appearances of sea snakes, turtles, manta rays, sharks and colourful nudibranchs. Most of the dive sites here are in an easy 8-15m depth, and allow for long, relaxing dives and great light and colour.

West Coast

The West coast is where the actual exposed; fringing reef runs parallels to impossibly white sandy beaches, whose shores are

protected by the shallow inner lagoon. The Whale Sharks congregate on the west coast, feeding on the nutrient rich waters during 'the season' and there are opportunities to dive both inside and outside of the lagoon. The deeper water outside the back of the reef has some interesting country, ranging from steep walls to huge overhangs and swim thrus in 15- 25. At certain times of the year, these swim thrus fill up with glass fish creating 'bait cracks'. The bait cracks attract all types of pelagic fish, schools of Trevally, Rankin cod, sharks, snapper and bull rays. The outcrops are also permanent homes to huge sea turtles, friendly potato cod and lazy wobbegong sharks. Unfortunately big, constant swells limit the number of clear days on the west coast, but there is some deeper ground that has more reliable visibility although notable less life. The inside of the reef also delivers some great diving to those that can overcome their contempt for shallow diving. The lagoon has a maximum depth of 9m and has provides great snorkelling opportunities, however the advantage of being on SCUBA and being able to remain sub-



COUNTERCLOCKWISE FROM TOP LEFT: Snorkelers swim with a whale shark; the islands of Ningaloo Reef; Gaping jaws of a whale shark



Nudibranch



COUNTER CLOCKWISE FROM LEFT: The sea splits a gorge into the rocky desert plateau; Sawfish with cleaner fish; Octopus on reef

merged allows for excellent light filled photos with brilliant colour. Life includes chevron barracuda, lagoon rays, schools of puffer fish, colourful reef fish and even a dugong slinking by.

Muiron Islands

For most divers, the term Island conjures an image of lush green palm trees

stretching towards sheltered clear water, fringed by shallow coral reef. The Muiron Islands are a little different. Pronounced 'Myoo-rons', these Islands are recognised as the most Northern boundary of the Ningaloo Marine Park. The Islands take around 50mins to reach from Exmouth and the crossing is not always appealing to divers susceptible to seasickness.

Once at the Islands, there is usually somewhere sheltered to dive, however conditions are unpredictable and heavily affected by wind, swell and current. Visibility is rarely exceptional at the islands, due to the constant movement and the powder fine sand of the seafloor being constantly tossed into the water column. Seasickness and poor visibility aside, the Islands do provide an awesome opportunity to explore some wild country. The strong currents make this an ideal place for soft corals and sponges to live and the colourful gardens stretch out as far as football fields. There are swim thrus that wind from 5m to 12m and some BIG pelagics! Kamikaze mackerel and tuna fly overhead, while curious manta rays inspect divers' bubbles. Lazy nurse sharks rest in caves and BIG cod appear from nowhere. The Islands are a place for BIG things and the best piece of advice here is to look up! Unfortunately the Muiron

Ningaloo Reef

Islands have experienced significant fishing pressure over the years and stories of huge cod feeding frenzies and bommies choc full of jumbo crayfish are becoming harder to believe. Unfortunately, this is also the reason why local diving operators have declined marine park management offers to install moorings at heavily dived locations. The reasoning is that for the small amount of coral destroyed by anchor damage, leaving the dive sites unmarked will minimise the loss of fish life from the area.

Bundegi Reef

Bundegi Reef is the "get out of jail card" for local operators, although ask any Exmouth locals and dive crew and they will tell you that it is one of THE most underrated dive sites of Exmouth and no less spectacular than the Eastern sites on the Muiron Islands. Bundegi reef is recognised by coral reef scientists as having

Western Australia



The North West of Western Australia is remote, but you can experience an untouched coral habitat that is visited by less than 200 divers a year—the Rowley Shoals! Imagine 400-meter drop offs, diving while surrounded by wrasse, other colourful fish and schools of pelagics such as mackerel, tuna and trevally. Further down is Ningaloo Reef, which is just as spectacular as the Great Barrier Reef and offers an impressive combination of marine life, such as Dugongs, aggregation of Whalesharks and schools of Manta Rays. Around Perth you will find magnificent Marine Parks with a mixture of tropical and temperate marine life. Just south of Perth, limestone reefs have formed an astounding underwater landscape with swim-throughs and caves. Access Rottnest Island from here and explore the whole range of dive sites available. Further down, you can't miss to dive Busselton Jetty as well as a few awesome wrecks including the *Swan* and the *Lena*. Still considered Australia but really much closer to Indonesia, are the exotic Christmas and Cocos Islands. Envision yourself in a tropical paradise with nothing else to worry about other than floating weightless amongst colourful fish and corals. ■



Exmouth Navy Pier

Northern Territory



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Not very well known for its diving but it is definitely worth it to check out the wrecks scattered in Darwin harbour, remains of a Japanese air raid in 1942. Find an abundance of reef fish darting around trucks, rifles and a Harley Davidson. Take a trip out to the Fenton Patches Artificial Reef with its reefs formed by tires, confiscated Chinese fishing vessels, bus stop shelters, barges and concrete pipes now harbouring tropical reef fish and schools of Jewfish. North of the Gove Peninsula you can find Barramundi, turtles, Whalesharks, Manta Rays, Trevally and Barracuda. ■



one of the highest coral recruitment rates in the world and has been deemed a productivity hotspot. This is hardly surprising as it is nestled between the nutrient rich Exmouth Gulf, (the lifeblood of the area) and the Ningaloo Reef. The dives here are shallow and need to be timed for slack tide or executed as drifts. When category five cyclone Vance hit Exmouth Gulf in 1999, a lot of the coral here died either as a direct result of being pounded by storm surge or being smothered by the turbid water and silt. A lot of this damage is still visible, however the reef is recovering at an impressive rate and it is fascinating to observe the new corals reaching up through skeletons of dead coral, deter-

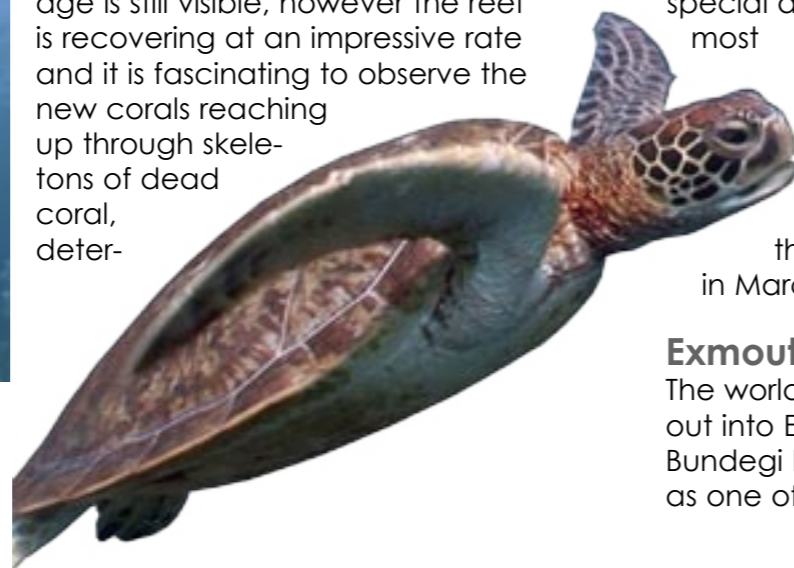


TOP TO BOTTOM: Diver peers through a school of reef fish; Abundant soft coral decorate the reef housing numerous reef fish species; Bannerfish and reef fish; Sea turtle chases jellyfish

mined to return Bundegi reef to its former glory. The larger boulder corals which survived the cyclone are like huge apartment blocks, filled with fish and animals at every level. Bundegi reef is "busy" with fish. Reef sharks, turtles, sweetlips, coral trout and Spanish flag can be found loitering amongst the bommies and manta rays will glide past later in the year.

Bottom scratchers enjoy diving Bundegi reef due to never ending species of nudibranchs which crawl past as well as triton shells, flatworms, sponge crabs and other critters. Although night diving isn't offered by most operators in Exmouth, Bundegi Reef special after most offer's something dark action-notably the coral spawning which occurs, seven to ten days after first full moon

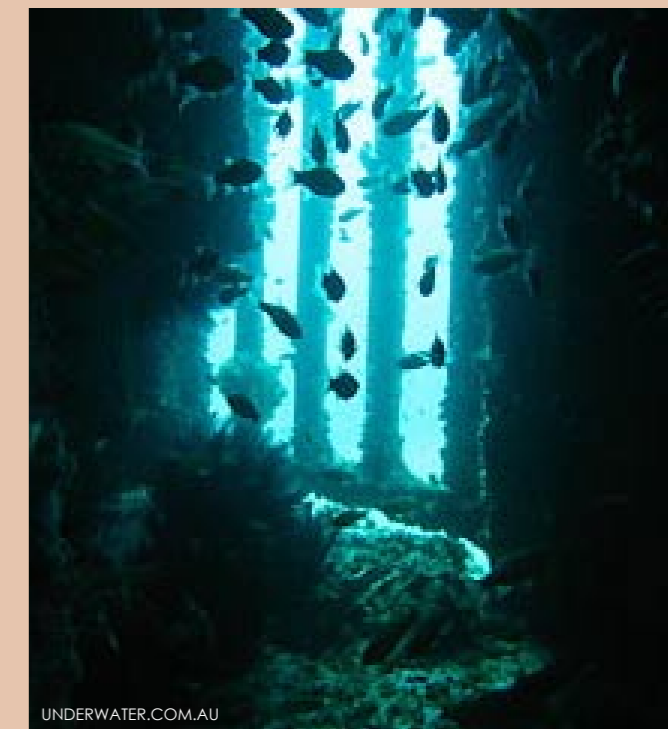
the in March.



Exmouth Navy Pier

The world famous Navy Pier stretches out into Exmouth Gulf and is next door to Bundegi Reef. The Pier has been rated as one of the top ten dive sites in the

Australia and one of the top ten Pier dives in the world- and with good reason! The pier has been closed to fishing for a number of years all the life has been left to grow and breed. As a result, the water beneath the Pier is filled to the brim with fish of all sizes and species. The max depth is around 10m, providing an easy dive and allowing plenty of bottom time. Entries are from the shore or a giant stride from a platform and dives need to be made during the window of slack tide. Due to tidal movement, visibility on the Pier is rarely exceptional, however the trade off is that the sheer abundance of life requires the diver to look little more than 5m for the next breathtaking sight! Despite low visibility the dive is easy to navigate and is a photographer's dream, with life everywhere and seemingly unafraid of divers. Huge, curious estuarine cod follow the groups of divers over the top of wobbegong and white tip sharks sleeping on the bottom. Sea snakes wind through the coral encrusted pylons and frog fish stare out from the discarded piping which litters the sea floor. Thousands of trevally swim laps close to the surface and elegant lionfish hang suspended in the water column and most divers exit the pier completely exhilarated and



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The Great Barrier Reef in a nutshell

Text by Michael Arvelund, PhD

(SOURCE: THE AUSTRALIAN GOVERNMENT; DEPARTMENT OF THE ENVIRONMENT AND HERITAGE. SEE ALSO: WWW.DEH.GOV.AU/HERITAGE/WORLD-HERITAGE/SITES/GBR/VALUES.HTML)

The Great Barrier Reef, one of Australia's first World Heritage Areas, was inscribed on the World Heritage List in recognition of its outstanding natural universal values:

- as an outstanding example representing the major stages in the earth's evolutionary history;
- as an outstanding example representing significant ongoing ecological and biological processes;
- as an example of superlative natural phenomena; and
- containing important and significant habitats for in situ conservation of biological diversity.

It is the world's largest World Heritage Area extending 2,000 kilometres and covering an area of 35 million hectares on the north-east continental shelf of Australia. Bigger than the entire area of Italy, it is probably the best known marine protected area in the world. The Great Barrier Reef's great diversity reflects the maturity of the ecosystem, which has evolved over hundreds of thousands of years. It is the world's most extensive coral reef system and is one of the world's richest areas in terms of faunal diversity.

The Great Barrier Reef World Heritage Area contains more than just coral reefs. It also contains extensive areas of seagrass, mangrove, soft bottom communities and island communities. Contrary to popular belief, the reef is not a continuous barrier, but a broken maze of coral reefs

and coral cays. It includes some 2,800 individual reefs, of which 760 are fringing reefs. These reefs range in size from less than one hectare to more than 100,000 hectares, and in shape from flat platform reefs to elongated ribbon reefs.

The Great Barrier Reef provides habitats for many diverse forms of marine life. There are an estimated 1,500 species of fish and more than 300 species of hard, reef-building corals. More than 4,000 mollusc species and over 400 species of sponges have been identified.

Other well-represented animal groups include anemones, marine worms, crustaceans (prawns, crabs etc.) and echinoderms (starfish, sea urchins etc.). The extensive seagrass beds are an important feeding ground for the dugong, a mammal species internationally listed as endangered. The reef also supports a wide variety of fleshy algae that are heavily grazed by turtles, fish, sea urchins and molluscs. The reef contains nesting grounds of world significance for the endangered green and loggerhead turtles. It is also a breeding area

for humpback whales, which come from the Antarctic to give birth to their young in the warm waters.

The islands and cays support several hundred bird species, many of which have breeding colonies there. Reef herons, osprey, pelicans, frigate

birds, sea eagles and shearwaters are among the numerous sea birds that have been recorded.

(CONTINUED ON PAGE 52) ►



School of Big Eye Trevally

MARK THOMPSON

Whale watching, anyone?



SOUTHERN CROSS UNIVERSITY IN LISMORE, NSW

Breaching Humpback Whale

determined to dive it again. Night dives on the pier are equally amazing and are offered to advanced divers when tides are conducive.

Ningaloo is exposed, unpredictable and pristine. It is one of the few places with world where you can visit and dive the exact same dive site three dives in a row and see something different on each. It is a place where you can sit at 14m and just 'be' with a turtle, or share a cleaning station with a manta ray three meters across and weighing 700kgs.

Come during the winter and you are virtually guaranteed to encounter the biggest fish on earth. Come during the summer and observe a sea turtle orgy.

Divers around the world come back here because Ningaloo gets under their skin. They are seduced by the red dirt and tur-

quoise sea, the casual and aloof nature of both the local people and marine life. They come back because there is nothing plastic, micro managed, strategically marketed or consumer driven about Ningaloo. The life is there and the diving speaks for itself. No five stars, no performance, just a box of chocolates- you never know what you're gonna get!

Wags and Kelly live, work and breath the Ningaloo Reef. They have dived and filmed the reef extensively and their high definition footage has appeared in documentaries, DVDs and on television around the world. Their passion is for educating people about the underwater world and nurturing a love and respect for the ocean. They have produced several underwater DVDs and continue to add to their archive year after year as Ningaloo Reef continues to surprise and delight them with new creatures and behaviours year after year. They

Come during the winter and you are virtually guaranteed to encounter the biggest fish on earth

are highly active in assisting local researchers with whale sharks, turtles and other marine life and vocal on local conservation issues arising on Ningaloo Reef. They also run their own

small diving charters for experienced divers and are sought after by film crews and professionals to help capture the best of Ningaloo Reef.

More pictures on Ningaloo reef can be found here: www.ningalooeffeach.com/pictures/page1.htm

To contact Wags and Kelly, please visit hdvunderwater.com ■



Serene azure waters at Heron beach

YANN ST. YVES



COUNTER CLOCKWISE FROM ABOVE: Divers explore the reef around the Cocos Islands; fan corals and lacey soft corals grace the ledges of the reef; An octopus stands on its arms in an upward stretch

Text and photos by Karen Wilshaw

A Taste of the Cocos (Keeling) Islands

For many, this question still arises: “Where the heck is the Cocos (Keeling) Islands?” and more than likely they proceed to look for Cocos in the Pacific Ocean. **WRONG!** Now I have to confess, I am one of those geographically challenged people. After grabbing the ever trusty and very dusty atlas that had been deeply buried since school days and after much searching, I found this tiny speck in the middle of the Indian Ocean.

Still not sure where it is? Well, draw a line from Perth in Western Australia to Sri Lanka and then a horizontal line from Darwin and where the two lines meet is approximately where this tiny horse-shoe shaped atoll is located. By the way, Charles Darwin visited the Cocos (Keeling) Islands in 1836 aboard the *HMS Beagle*, and it was during this visit that he developed his theory of atoll formation. He spent some time exploring the southern atoll and also visited the northern atoll some 24km further away. In his publication on coral reefs in 1842, he was the first to propose the theory of reef formation and evolution, building on his discovery of coralline fossils in inland areas and in mountains earlier in the journey and his visit to the islands. That theory, which is still held as valid, explains the dynamics of the three principal categories of coral formation.

Before moving to Cocos, I was a non-diver. So, after a few months of being land-locked, it became obvious that I really needed to learn to dive. That was nearly seven years ago. My open water sessions were conducted in pool-like conditions at Direction Island, one of the most beautiful islands in the atoll. Here, whilst taking my first fin strokes and learning to trust the reg, endless schools of small fish came in close to investigate this clumsy noisy bubble blowing human. My first 18-metre dive was conducted at the Cabbage Patch, and this is the first “taste of Cocos” I am going to share.

The Cabbage Patch is one of my favourite dives and I suppose, as it was my first experience seeing the extraordinary colours the underwater world has, it remains etched for life. Huge stands of pristine golden and green *Turbinaria reniformis*, Cabbage or Salad corals, adorn the steep drop-off. It covers an



area well over 500 metres square and is home to a myriad of fish life. Thousands of Goldenback Anthias (*Pseudoanthias evansi*) and Ternate Chromis (*Chromis ternatensis*) use the leafy formation of this hard coral as their refuge. When the sunlight hits the anthias and the cabbage coral, it literally glows golden. With a blue

water background, it really is an unbelievable sight.

The corals end around a depth of 18 metres. From there, the scenery changes to a rocky substrate before ending on a pure white sandy beach adorned with red whip corals. Indian Ocean Bannerfish and Golden Damselfish appear to have

Cocos Islands

(THE GREAT BARRIER REEF, CONTINUED FROM PAGE 50)

The World Heritage property is also of cultural importance, containing many middens and other archaeological sites of Aboriginal or Torres Strait Islander origin. Some notable examples occur on Lizard and Hinchinbrook Islands, and on Stanley, Cliff and Clack Islands where there are spectacular galleries of rock paintings. There are over 30 historic shipwrecks in the area, and on the islands are ruins and operating lighthouses that are of cultural and historical significance.

About 98 per cent of the World Heritage Property is within the Great Barrier Reef Marine Park, the remainder being Queensland waters and islands. The Great Barrier Reef Marine Park was declared in 1975 with the purpose of preserving the area's outstanding biodiversity whilst providing for reasonable use. This has been achieved using a spectrum of zones ranging from General Use Zones to Preservation Zones. In very broad terms, these zones allow ecologically sustainable activities, but all have an overriding conservation objective. Most reasonable activities such as tourism, fishing, boating, diving and research are permitted to occur but are controlled through zoning and management planning to minimise impacts and conflicts with areas of high conservation value and other users.

Today, the great majority of the Marine Park is still relatively pristine when compared with coral reef systems elsewhere in the world. An independent report published in 1997 concluded that the Reef is in good condition and is being managed effectively. These are also the findings of two major workshops to which over 100 scientists and management experts contributed. Both these workshops have now been summarised in the report titled *State of the Great Barrier Reef World Heritage Area 1998*, released in November 1998.

The Australian Government and State Government have a cooperative and integrated approach to management of the Great Barrier Reef World Heritage Area.

The Great Barrier Reef Marine Park Authority (GBRMPA) is the Australian Government agency responsible for overall management, and the Queensland Government, particularly the Queensland Parks and Wildlife Service, provides day-to-day management to the Authority. Integrated management is also assisted by: a Commonwealth Act specifically for the Marine Park that, if necessary, provides over-riding powers; complementary legislation for most adjoining State waters; formal agreements with Queensland, and with various government departments, industry, research institutions and universities; and strategic zoning plans and site-specific management plans.

GBRMPA's current work program stems from four issues that have been identified as being critical for achieving adequate protection and management of the Reef in the short to medium term: water quality and coastal development; fisheries; tourism and recreation; and conservation, biodiversity and world heritage.

Further reading

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Lucas, P. H., Webb, T., Valentine, P. S. and Marsh, H. 1997, *The outstanding universal value of the Great Barrier Reef World Heritage Area*, Great Barrier Reef Marine Park Authority, Townsville, Qld.
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FIONA LIGNUM



truly looks like a ski slope, falling gently at first to get your confidence before it drops steeply into an endless abyss. It's another favourite for the photographer, as this is critter heaven. Here, you can spend weeks and never really see all of what it has to offer. There are bombies dotted here and there that have treasures of marine life that I am only just beginning to discover. Dotted over the snow-like slopes, the bombies are covered in soft leather corals, porities, Lobophyllia and delicate sea ferns. Within these bombies, with their many hidey-holes are Durban Dancing Shrimps (*Rhynchocinetes durbanensis*), Yellow-margin Morays, Juvenile Emperor Angelfish, nudibranchs and thousands of tiny glassfish just to name some of the marine life. During my last dive, our dive group discovered three different species of tiny pipefish and an indescribable tiny see-through shrimp.

Each time I go to the Ski Run, I rarely fail to see octopus and usually it's not just one, but several. They are amazing to watch, particularly when hunting with the scavenger mates, the Bluefin Trevally or Goatfish.

Lizardfish



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ABOVE: Dugong. TOP CENTER: Dugong and dolphins. LEFT INSET: Coral reef fish

This little guy has its eggs lined up on an old strand of wire coral and is very photogenic and extremely co-operative while he protectively guards his eggs. It's just one of the many fish friends I like to check on

regularly to see what has changed in the family.

Returning towards the boat at a shallower depth, the enormity of the Cabbage Patch becomes apparent. It truly is a spectacular dive site with its most amazing marine inhabitants.

The Ski Run, as the name suggests,



claimed these whips as their piece of paradise. Travelling slowly along the slope, the coral comes to an end and opens up to a lovely white sandy chute—home to hundreds of curious and shy Spotted Garden Eels (*Heteroconger hassi*). Great to watch, hard to photograph successfully. Whitetip Reef sharks are often found sleeping on the sand—now these are great to capture digitally as they tend to allow you a close encounter before slowly moving off.

Just a little further along the corals change to another greenish hard coral, *Porites rus*, a prostrate type of coral with fingerlike formations. Here, I like to visit a very friendly Golden Damselfish.





CLOCKWISE FROM TOP LEFT: A pair of Trapezia crabs share a shelter in the hard coral; Fusiliers school in a blue mass; Blacktip sharks slither along a shallow bed of a lagoon

I can spend hours with these guys (and sometimes my entire dive is with the occy's). Once they realise you aren't going to interfere, they happily allow you to accompany them on their hunt.

But, I must move on from the shallows. If you are a deep dive junky, then the Ski Run can cater for you as well. Heading down the kiddies' slope, the terrain drops sharply into a steep canyon with beautiful healthy stands of Gorgonian Fans and Whip Corals adorning its sides. And

it is here at around 35 metres (and sometimes deeper) a very unique angelfish is found, the Ornate Angelfish (*Genacanthus bellus*). Rarely seen, let alone photographed, these gorgeous fish have the most tenacious character, swimming towards you most defiantly before taking cover under one of the ledges. I have only seen the females and can only assume the males are around

somewhere. However, the female's unusual markings and colouration is most beautiful. Obviously, at these depths, bottom time runs out pretty quickly. However, as most of the smaller bom-bies and their hidden treasures are at 10 metres and shallower, you can spend

heaps of time off gassing whilst exploring.

The Cabbage Patch and Ski Run are just a miniscule taste of diving on the Cocos (Keeling) Islands. There are over 30 regularly dived sites and hundreds more to discover. I haven't even mentioned the mantas, sharks, dolphins,

turtles, tuna and barracuda that are regularly seen, or the unusual and gentle dugong, Kat, who made Cocos his home some 4 years ago. The diving is extremely diverse and caters to the majority of divers, whatever their interest.

Crowds are not an issue as Cocos Dive is the only dive operator. Between their two vessels, *Putri Laut* and *Sayap Kecil*, the maximum number of divers they cater to is sixteen, with preferred numbers from four to ten.

For more information contact: Dieter Gerhard, Cocos Dive, at tel. +61 8 9162 6515, www.cocosdive.com or email scuba@cocosdive.com ■

The Vanishing Dragon



Dragon

Text by Carly Maple

When cameraman Brenton Dean first approached me a few years ago, about writing a wildlife documentary script that would tell the life ecology of leafy sea dragons, I thought, "an entire hour on the one sea creature?" That would absolutely bore people to sleep right?! I had only just got my scuba diving ticket and my diving experience was little to none. The leafy sea dragon is the state marine emblem in South Australia, where we both live and our filming production company; 'Abyss Pictures' is based. And the thought of filming a creature in our own backyard was something that I thought really wouldn't

interest many, especially an entire documentary on what is, the larger cousin of a sea horse. But 4 years later, the completion of the documentary that we would come to name, "The Vanishing Dragon," would be seen and heard by more people than we ever anticipated and even begun to imagine. Having screened twice already Australia wide on the National Nine Network, to now being distributed internationally by National Geographic, it seems the entire world has a fascination with one of our biggest secrets downunder. This is an insight into the documentary on leafy sea dragons...



LEFT: Close up of the lacy countenance of the Leafy Sea Dragon
BOTTOM CENTER: Close encounter with a dragon

and is told by those who know it best. Prepare to lose yourself in a beautifully shot film and learn more about a dragon so majestic in nature and appearance... the vanishing dragon.

The making of...

"The Vanishing Dragon" took well over a year to completely research and write. Little has been recorded about these creatures, and information is very hard to find. The only way to properly research them was to visit them and study their behaviour in their own environment. The documentary reveals information, which has never been recorded before. For example, the incubation period... it was believed that leafy sea dragons took only 4-6 weeks to hatch the eggs. But this isn't the case. The male carries the eggs for a period of about 7-8 weeks, and as the eggs begin to turn a ripe purple, he drops them all in 24-48 hour period. But the eggs don't just drop off, he aids in the babies hatching by shaking his tail, causing the eggs to jiggle. Also, he rubs his tail gently against seaweed and rocks as an aid in dislodging them. Such information as this, has been corrected and the documentary is full with new and exciting information and footage.

Cameraman and Producer, Brenton Dean, spent summer after summer under Rapid Bay Jetty in South Australia attempting to capture the breeding and the egg transfer in the wild. He has been following one pregnant male leafy sea dragon in particular over the eight week course of incubation. This is the only recording ever, of a male leafy sea dragon giving birth in the wild.

"The Vanishing Dragon" DVD is available for purchase from underwater.com.au ■

duction. After a courting dance that can continue up to weeks at a time, it's the male that will eventually fall pregnant once the female has deposited around 250 eggs onto his tail. For the next 5-6 weeks, the father will spend his time buried deep in the thick kelp meadows of the ocean floor and protect his young relentlessly from predators. Eventually the father will give birth and the eggs will drop.

Sadly, only 5% of the newborn will survive to reach maturity of 2 years of age. Once born, the tiny cm long dragons are highly susceptible to predators. But surprisingly, these predators are not the biggest threat to the species. The sea grass loss along the southern coastline of Australia is astounding. Effluent disposal and stormwater run off have been killing off the sea grass along this coastline for years. The degradation of sea grass not only affects the leafy sea dragon, but is the initial feeding ground for all creatures that live in the ocean. All sea creatures rely on it.

The underwater world makes up over two thirds of our planet. To preserve this world and the creatures that live in it, means the sea grass must flourish like it once did before. This is a story about a dragon that symbolises all of these creatures

Vanishing Dragon DVD

"The Vanishing Dragon" (a winner at the Japan Wildlife Film Festival 2005) is a visually spectacular 52' wildlife documentary based on perhaps the most camouflaged of all ocean creatures; the leafy sea dragon. Unique to the rugged and fierce coastline of Southern Australia, the delicate leafy sea dragon resides. In order to survive in such a hostile environment, the leafy sea dragon relies completely in its ability to mimic a piece of seaweed. The leafy appendages placed on the head and body of the sea dragon mean that it can perfectly blend into

its own environment.

For scuba divers, the chance of seeing one of these 'medieval' creatures in the wild, is to travel to the southern coastline of Australia. One of the dragon's most favourite of homes is under Rapid Bay Jetty situated on the Fleurieu Peninsula in South Australia. Under this particular jetty there are known to be over 30 breeding pairs and another 15 individuals that haven't yet paired up for mating. Because of their tremendous ability to camouflage, the leafy sea dragon is hard to find. Not to mention, they all look the same. The only way to tell one individual from another,



er, is to take a close up photo of their head and compare it to other photos the white markings on their face and snout, are just like finger

Syngnathidae family, and just like its cousins, the weedy sea dragon, sea-horse and pipefish, it's the male that has the extraordinary role in repro-

prints and are unique to each and every dragon.

In terms of sexing dragons, the easiest way to tell is during breeding season. The leafy sea dragon belongs to the



fact file



Australia



▼ Map of Australia



Delicate spiral forms of the Christmas worm. INSET: Tiger anemones

History About 40,000 years ago, aboriginal settlers arrived on the continent from Southeast Asia. In the 17th century, the first Europeans began exploration. Formal territorial claims were first made in 1770, when Capt. James Cook took possession of the land in the name of Great Britain. In the late 18th and 19th centuries, six colonies were created which federated and became the Commonwealth of Australia in 1901. Rich in natural resources, the new country began to rapidly develop agricultural and manufacturing industries. The country made a major contribution to the British effort in World Wars I and II. During the past century, Australia has transformed itself into an advanced, internationally competitive market economy. Due in large part to economic reforms in the 1980s, the country boasted one of the OECD's fastest growing economies during the 1990s. Long-term concerns include pollution, ozone layer depletion, and conservation and management of coastal areas, especially the Great Barrier Reef. Government: federal parliamentary democracy. Capital: Canberra

Geography Located in Oceania, Australia is a continent between the Indian Ocean and the South Pacific Ocean. It is made up of six states and two territories: Australian Capital Territory, New South Wales, Northern Territory, Queensland,

South Australia, Tasmania, Victoria and Western Australia. It has several dependent areas including Ashmore and Cartier Islands, Christmas Island, Cocos (Keeling) Islands, Coral Sea Islands, Heard Island and McDonald Islands, Norfolk Island, Macquarie Island. It is the world's smallest continent but sixth-largest country with a majority of the population concentrated along the eastern and southeastern coasts. Perth, on the west coast, is affected by the invigorating tropical sea breeze known as the "Fremantle Doctor". It is one of the most consistent winds in the world. Coastline: 25,760km. Terrain: mostly low plateau with deserts and fertile plains in southeast. Lowest point: Lake Eyre, 15m. Highest point: Mount Kosciuszko 2,229m

Climate is generally arid to semi-arid. It is temperate in south and east and tropical in north. Natural hazards: cyclones along the coast, severe droughts and forest fires. Environmental issues: industrial development, urbanization, soil erosion from overgrazing and poor farming practices, rising soil salinity due to the use of poor quality water, desertification. Clearing for agriculture threatens natural habitats of many unique plant and animal species. The Great Barrier Reef off the north-east coast is the largest coral reef in the world and is threatened by increased shipping and its tourism.

There are limited natural fresh water resources.

Economy A Western-style capitalist economy with a per capita GDP on par with the four dominant West European economies keeps Australia economically competitive. What's fueling the economy? Rising domestic output,

robust consumer and business confidence and rising exports of agricultural products and raw materials. Key factors include low inflation, Australia's emphasis on reforms and growing ties with China. However, drought, weak foreign demand, and strong import demand inflated the trade deficit from \$8 billion in 2002 to \$17 billion in 2005. But Conservative fiscal policies maintain Australia's budget in surplus from 2002 to 2005. Natural resources: bauxite, coal, iron ore, copper, tin, gold, silver, uranium, nickel,

tungsten, mineral sands, lead, zinc, diamonds, natural gas, petroleum. Agriculture: wheat, barley, sugarcane, fruits, cattle, sheep, poultry. Industry: mining, industrial and transportation equipment, food processing, chemicals, steel

Population 20,264,082 (July 2006 est.). Ethnic groups: Caucasian 92%, Asian 7%, aboriginal and other groups 1%. Religions: Catholic 26.4%, Anglican 20.5%, other Christian 20.5%, Buddhist 1.9%, Muslim 1.5%, other 1.2%, unspecified 12.7%, none



15.3% (2001 Census)

Languages English 79.1%, Chinese 2.1%, Italian 1.9%, other languages 11.1%, unspecified 5.8% (2001 Census)

Currency Australian dollar (AUD); Exchange rates: 1 USD= 1.31 AUD, 1 EUR=1.67 AUD, 1 GBP=2.48 AUD, 1 SGD=.84 AUD

Internet Users 14,663,622 (2006) SOURCE: WWW.CIA.GOV

Decompression Chambers

- Wesley Hospital (07) 3371 6033
- The Alfred Hospital (03) 9276 2269
- Royal Adelaide Hospital (08) 8222 5116
- Royal Darwin Hospital (08) 8922 8888
- Fremantle Hospital (08) 9431 2233
- Royal Hobart Hospital (03) 6222 8308
- Prince of Wales Hospital (02) 9382 3880
- Townsville General Hospital (0)7 47962080 ■