

# Bookshelf

**State of the Great Barrier Reef World Heritage Area 1998**  
GBRMPA (1998)

Up-to-date information and statistics on the GBR, compressed into 140 pages in this useful booklet, is presented in two main sections — Environmental Status and Management Status. Call (07) 4750 0700 or e-mail registry@gbrmpa.gov.au to order copies.

**State of the GBR WHA Workshop Proceedings held 27-29 Nov 1995**  
GBRMPA (1997)

**Queensland's Fisheries Resources**  
Current Condition and Recent Trends 1988-1995  
L.E. Williams (Ed)  
DPI (1997)

**Australian Fisheries Resources**  
Patricia J. Kailola, et al.  
DPI (1993)

**Dollar Values and Trends of Major Direct Uses of the GBR Marine Park**  
S. Driml  
GBRMPA (1999)

**The Environmental Effects of Prawn Trawling in the Far Northern Section of the GBRMP:**  
1991-1996

Final report to GBRMPA and Fisheries Research and Development Corporation  
CSIRO/DPI (June 1998)

**CRC Reef Research Centre 'Exploring Reef Science' notes:**  
• Research, not rumours, needed for live fishing industry (1997)  
• Visitor survey helps tour operators understand travel trends (1997)  
• Social and economic study helps aquarium fish industry (1999)

*Ocean & Shoreline Management 15 (1991) 57-78*

**Tourism Development in the GBRMP**  
Richard Kenchington.



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# Tropical Topics

An interpretive newsletter for the tourism industry



Humans and the Reef, part II

No. 53 February/March 1999

## Notes from the Editor

What is the Reef worth? Normally *Tropical Topics* is primarily concerned with the natural values of the GBR (Great Barrier Reef) but this issue — the second in the series, *Humans and the Reef* — takes a look at its economic value.

A recent study, using figures from the year 1995/96, for the three major direct uses of the Marine Park, has just been published. Their gross value is summarised as:

Commercial Tourism...	646 972 000
Commercial Fishing...	143 000 000
Recreational Fishing and Boating...	122 478 000
Total .....	912 450 000

Tourism has shown particularly rapid growth, its current value now estimated at over \$1 billion (some aspects were not included in 1996 figures).

The statistics supplied throughout this issue are as up-to-date as possible but inevitably there is a time lag between their collection and publication. However, most situations (apart from tourism) have been fairly stable so they can be considered reasonably valid today.

I would like to thank Sian Damsche and Jim Higgs, QFMA, Peter Murphy, AIMS, Tony Carol, QPRI, Phil Hales and Chris Robertson, DPI and Ross Williams, GBRMPA for their help with this issue.

## The onward march of tourism

Tourism, which was almost non-existent in 1950, has grown to become the principal industry in the Great Barrier Reef World Heritage Area (see *Notes from the Editor*, left).

There are few statistics available from the early days but some indications of the growing awareness of the region as a holiday destination. One publication, *Cairns — a Guide for Residents, Tourists and Business Men — 1938*, states, "without a doubt, the tourist traffic is a highly important industry to the Cairns District. During the winter months thousands of visitors take the opportunity of visiting the 'sunny north' in order to escape the rigours of the southern winter." A 1946 report, produced by the newly established Queensland Tourist Development Board, stated that 5000 visitors a year were visiting "the group of Barrier Reef islands of the Whitsunday passage, already selected by this Board as one of Queensland's outstanding tourist attractions".

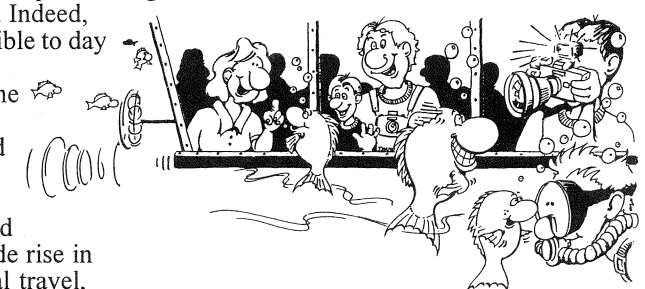
Fishing and shell gathering were the main recreational uses of the Reef at this time, with parties sometimes making massive collections of both during outings to places such as Green Island and Heron Island. Appreciation of the coral reefs — now the main focus of most reef trips — was confined in the early days to reef walks at low tide or glimpses through glass bottomed boxes. Indeed, few reefs were accessible to day trippers, the most spectacular ones, in the clearest water, too far from shore for limited trips.

Technology, combined with a rapid worldwide rise in interest in recreational travel, transformed reef tourism in the

late 1970s and '80s. The first large, highspeed catamarans, capable of carrying 150 people at over 25 knots — and thus to previously inaccessible reefs — were introduced in 1982. Snorkelling gear, and then SCUBA gear, began to be used with frequency at about the same time.

Consequently, the number of companies involved in the industry increased dramatically, from fewer than 10 in 1968 to 180 in 1987 and 742 in 1998. Similarly, there has been a huge increase in the numbers of visitors\*. In the early 1980s, this was estimated at 150 000 visitor-days per year (40 times the visitation of the pre-1950 period). In 1987 this had risen to 450 000 and, 10 years later (1997), 1.6 million visitor-days were recorded (EMC returns).

In financial terms, the gross output of tourism in 1987 was measured at around \$200 million; by 1996, this had risen to roughly \$650 million with the total value of reef tourism now calculated at over \$1 billion. Growth forecasts for the next decade /range from five to 10 percent.



\*Statistics do not include private recreational use.

**Marine Parks**



## Marketing the Reef

What does a tourist want from a day on the Reef? Well, the answer depends on the tourist. Some are happy to lounge on a pontoon topping up their suntan, without dipping a toe in the ocean, while others want an action-packed day of diving. So how can operators ensure that they are providing the perfect experience — and that they are marketing themselves in the best way?

As part of a CRC Reef Research Centre-funded project, researchers have been creating a Reef Marketing Database using the results from nearly 6500 surveys which have been collected since 1994. These surveys (in four languages) have sampled visitors from several locations up and down the Reef. Also included in the database is information from other organisations on international and domestic visitors in Australia and in a range of other countries.

The aim of the Database is to provide reliable and relevant information on reef region tourists to assist operators and managers to develop more sustainable tourism on the GBR. Sustainable tourism must minimise negative impacts, maximise positive impacts and create visitors who care about the destination. This involves matching the right visitors to the right activities in the right places through reliable relevant visitor information and sound marketing practice.

## Medicine from the deep

Certain marine organisms have the potential to become the biggest earners on the Reef. Increasingly, in the search for biologically active compounds which may be used to design new drugs and other products, scientists are turning to the complicated chemistry of the tropical marine environment. Since the world's top selling drug (for use against gastric ulcers) earns a staggering \$20 million a minute, the stakes are obviously high.

Already sea fans have provided useful ingredients for skin preparations, and effective painkillers have been produced from cone shells. The very complex toxins these molluscs produce can kill — but they also contain many active ingredients such as muscle relaxants which can be put to good medical uses. Coral sunscreens are also well on their way to production. Reef-building corals are at risk from high UV radiation but must allow the sunlight to reach the symbiotic algae (zooxanthellae) within their tissues which are the source of their energy and nutrients. Their solution is to manufacture a type of sunscreen which, since its discovery in 1969, has been synthesised and modified for human use.

Sponges (as mentioned in *Tropical Topics* 40) and bryozoans are a particularly rich source of chemical compounds. They have an ancient evolutionary lineage, are involved in complicated relationships and, being unable to move, need other means of defence, most often chemical. Many are being investigated and are considered to have huge potential. Also of great interest are the micro-organisms which are even more

diverse than invertebrates.

Pharmaceutical drugs are not the only goal. New compounds could help with the development of a wide range of products. For example, since so many marine creatures avoid becoming fouled with barnacles, mussels and algae, the chemistry involved could lead to the development of an anti-foulant which would be more environmentally friendly than the very toxic tributyltin currently used. Agro-chemicals, enzymes, paint compounds ... the possibilities are practically limitless.

The Reef is being investigated thoroughly by a number of institutions and universities but this does not mean that huge amounts of organisms are being removed. Rather like geologists, who take chips of rocks back to the laboratory for analysis, these 'bioprospectors' need as little as 10g of material for screening with modern techniques. When a useful compound is detected, large-scale harvesting is generally not a consideration. Instead the aim is to either synthesise the chemical or perhaps to culture the source organism. Genetic engineering is also a possibility. Significant progress is being made and several patents have been applied for. In most cases, however, commercial confidentiality means that the details of discoveries are kept well under wraps until they are ready to reach the marketplace.

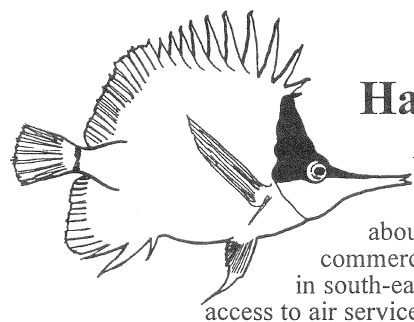
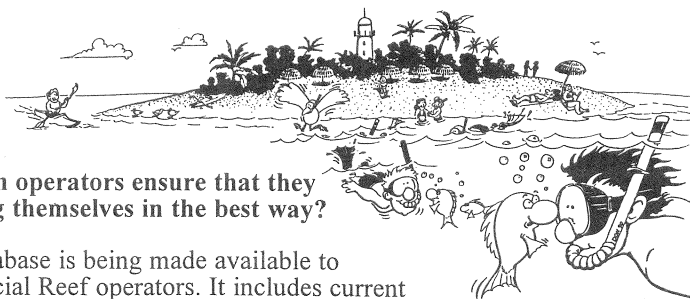
The Database is being made available to commercial Reef operators. It includes current visitor trends, overseas visitor figures, travel patterns, expenditure details and personal demographics of Reef travellers. It has shown that almost 40 percent of the 1.6 million visitors are from overseas, with the percentage as high as 70 percent in Cairns. Nonetheless, many are repeat visitors who, research shows, tend to opt for smaller rather than large vessels for subsequent trips. In addition, the surveys have shown that almost half the visitors to pontoons don't leave them, often because they don't want to get into the water, and would like a greater choice of alternative activities. However, the strongest message from those interviewed (82 percent) is a request for greater interpretation and education about the Reef's complex ecosystem — so keep reading *Tropical Topics*!

More details of the research are available on the Reef tourism team's website at <http://www.jcu.edu.au/school/cea/tourism/ARRVR>

## Indigenous use of reef resources

The cultural, historical and socio-economic associations between Indigenous peoples and the GBR, outlined in detail in *Tropical Topics* 51, continue, rights and responsibilities for particular tracts of land and sea having been inherited through lines of descent. Hunting, fishing and gathering are important to many coastal peoples, providing up to 80 percent of protein in places. There is also involvement in commercial fisheries; for example, a special quota of 50t of trochus has been allocated to Indigenous communities around the north-eastern Cape York Peninsula.

Of particular concern to Indigenous peoples are declines in dugong numbers in the GBR region which are thought to be due mainly to a combination of fishing, increased boat traffic, modern farming practices, land clearing and sewage outlets into seagrass beds. Hunting by Indigenous peoples, for whom the dugong is very important symbolically as well as a source of meat and oil, can be carried out under GBRMPA permit except in Preservation Zones and Dugong Protected Areas. Following serious declines in the southern GBR, however, most traditional owners have decided to suspend dugong harvesting and there is now no permitted hunting south of Cooktown. Nonetheless, the interest of Indigenous peoples in dugongs transcends hunting and they seek involvement in all areas and aspects of their management.



## Harvesting the Reef

### Aquarium fish

Some fish are targeted purely because of their good looks. Caught live for the aquarium trade, they earn about \$3.6 million a year. There are 64 licensed commercial collectors in Queensland, the majority concentrated in south-east Queensland and Cairns where they have ready access to air services for export to the USA, Asia and Europe. Most of these collectors work from a single boat, with two to four crew, reasonably close to their home ports. Most use the hookah (see p4) which allows them to spend quite long periods of time under the water. In contrast to many Asian countries, the use of cyanide and other chemicals to collect fish is totally banned in Australia. Instead collectors use hand nets or herd the fish into small barrier nets. The main targets are damselfishes, wrasses, butterflyfishes, angelfishes and anemonefishes, along with some sharks and rays. The fish are then kept in tanks, on board, for about one to five days. Some are eventually sold locally, but most are exported. The cost of this can be very high, because of the weight of water required by the fish. A pelagic shark of just 60cm length needs to be 'packaged' in about 300kg of water while a sizeable maori wrasse needs 600-800kg.



### Trochus shells

The trochus and pearl shell (mother-of-pearl) industries went into a severe decline following the development of plastic buttons in the 1950s. However, changes in fashion since the 1970s have led to a renewed demand. Apart from buttons — which are mostly manufactured in Japan and Europe — trochus shell is also used in the production of cosmetics, ceramics, luminescent paints and ornaments.

A total of 250t may be taken by the six licensed collectors in the east coast fishery, while a further 50t is allocated to Indigenous authorities. Harvesting is done by reef walking at low tide or using mask and snorkel, or hookah. Flesh is extracted after cooking the shell for 5-10 minutes and may be eaten fresh or dried or frozen for later use.

### Shell collecting

A total of six commercial collectors are licensed to collect specimen shells in Queensland with a quota of a total of 10 live specimens of each species per year. Of high quality, they are sold to specialist collectors, museums and other institutions. Recreational hobby collectors are authorised to gather a maximum of five specimens of each species in any one 28-day period — from general use zones within the Marine Park.

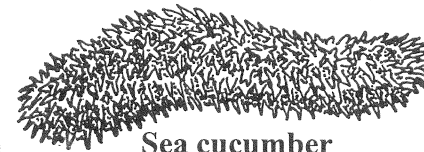
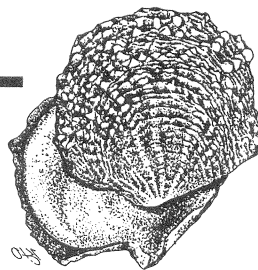
### Coral, shellgrit and star sand collection

Coral has traditionally been collected for the souvenir and ornamental trade but, increasingly, live coral for aquariums has become more important as the technology for keeping them alive has developed. This has led to an increasing demand for species other than the fast growing hard corals which have traditionally been collected for souvenirs. Live corals collected for aquarium display are usually small specimens of soft coral species or hard coral species with fleshy polyps. There are approximately 55 coral collecting sites, each of approximately 8ha, which can be harvested up to a four-tonne quota per year. Actual harvest levels are below a total of 50 tonnes annually.

Shell-grit (the broken remnants of shells) and star sand, which is sand composed of forams, is also collected, chiefly for aquariums. Shell-grit is collected outside the GBRMP at a few shore locations such as Yeppoon and Hervey Bay. Star sand is collected by hand, under water using mask and snorkel, SCUBA or hookah.

### Pearling

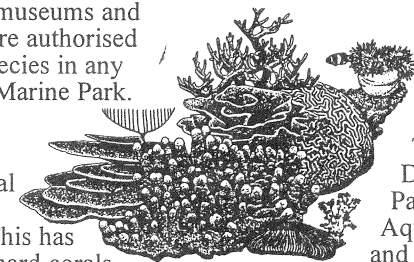
The emphasis in the Australian pearling industry has shifted from shell (which was overexploited in the first half of the century) to pearls. A flourishing aquaculture industry has grown in WA since the first cultured pearls were produced there in the late 1950s, but the industry is very small in Queensland with most ventures based in the Torres Strait rather than in the GBR region. The highest value pearl oyster, the gold-lipped oyster, does not thrive on coral reefs. However, the best potential sites for farms — away from the Reef — are already in use; sheltered bays are used for recreational boating and tourism while the lagoon areas are being trawled.



### Sea cucumber

The fishery for sea cucumber (or beche-de-mer or trepang as processed sea cucumbers are known), is Australia's oldest commercial industry. Since about 1700, Macassan people from Indonesia were collecting them from northern Australia to sell to the Chinese — until stopped in 1907. This fishery has a more recent history on the GBR. Annual catches of between 51t and 5420t were recorded between 1895 and 1948, but demand and prices dropped with the closing of mainland China after the communist revolution, and the industry went into decline. However, there has been a revival in the last 15 years or so, following economic liberalisation and growing affluence in China and the consequent growth in demand for sea cucumbers. Changes in the Chinese system of exchange control has also led to the extensive use of certain types of beche-de-mer as a barter currency. In addition, demand has increased from Chinese communities in Australia, Canada and the USA.

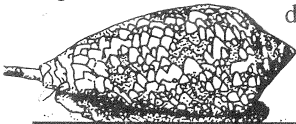
Currently 18 collectors are permitted to collect a total of 380 tonnes of sea cucumbers on the east coast of Queensland. A number of species are taken, however only some of these are of high value. They may be hand picked from the reefs at low tide, harvested by divers or speared from dinghies. Processing of beche-de-mer is lengthy, involving cleaning, boiling, sun or machine drying and smoking but the dried product stores well. It is exported mainly to Singapore and Hong Kong where much is repackaged and re-exported to mainland China and other Asian countries. Frozen and chilled sea cucumbers are also exported.



### Join in

The Fisheries Discussion Paper for the Aquarium Fish and Coral

Fisheries will be released in April 1999 as the first stage of the management planning process for these fisheries. Copies may be obtained from the QFMA after April and public comment will be welcome. Discussion Papers are also being prepared for the sea cucumber, trochus and tropical rock lobster fisheries and will be released later in the year.





# Reef resources

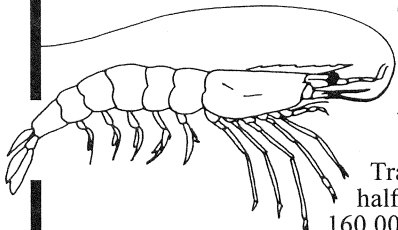
## Commercial fishing

In 1994 the total commercial catch of all marine species in Queensland amounted to approximately 21 672 tonnes — 10 726t of crustaceans (including 5883t prawns), 9824t fish and 1122t molluscs.

The commercial fishing sector is the fifth largest primary producer in Queensland, worth \$175 million a year to the economy when valued at prices paid to fishers at the wharves. Of this, \$143 million is earned from product caught in the Great Barrier Reef Region (GBR). Much of this, particularly prawns, scallops and live fish, is exported. Smaller harvest fisheries are looked at on page 7.

### Trawling

Currently about 800 boats are licensed to fish for prawns and scallops with otter trawl gear in the GBRMP. This mainly takes place in the lagoon, between the Reef and the coast, with the greatest catch coming from Princess Charlotte Bay and offshore Townsville. However, new technology is now allowing trawlers to fish closer to the reefs to target red-spot king prawns, a reef species. In addition, 210 boats are licensed to fish for prawns in inshore and estuarine waters with beam trawl gear, but most of this takes place outside the GBR.



Trawlers currently work in almost half of the area of the GBR — 160 000sq.km out of 350 000sq.km.

About 10 percent of the lagoon (of which 40 percent is in the Far Northern Section) is closed to trawling as is over 50 percent of inter-reefal areas. In order to minimise capture of adolescent prawns, trawling is prohibited north of Cape Tribulation between 15 December and the end of February.

Overall, the trawl catch is worth about \$150 million annually. Queensland-wide, it produces, on average, 8000t of seafood each year. This includes 5000t prawns, 1000t saucer scallops, 1500t stout whiting (southern Queensland) and 500t bugs. Tiger and endeavour prawns make up the most significant catch (3200t, on average, annually), followed by king and banana prawns.

**Bugs**, also known as bay lobsters, are a valuable byproduct of the trawling industry with most (in Queensland) caught from the GBR, mainly from between Ingham and Mackay and from Rockhampton to Hervey Bay. In this area, sand bugs, which live in clear deep waters between the reefs, make up about 10 percent of the annual trawl catch by weight. Mud bugs, which live in shallower, muddier, inshore waters comprise 4 percent of the catch weight.

**Saucer scallops** are a significant catch, the majority collected between Bundaberg and Yeppoon.

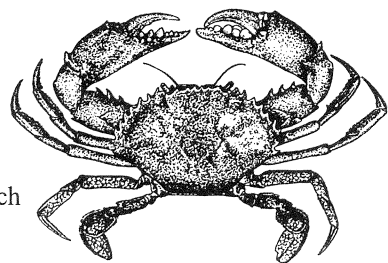
### Crab fishing

Commercial fisheries for crustaceans, other than prawns, are worth about \$17 million a year in Queensland. Crabs may be specifically targeted or may be taken as part of a mixed fishing operation.

**Mud crabs** are fished commercially and recreationally along the Queensland coast, about 69 percent of the commercial catch (average 400t per year) coming from the GBR. The majority are caught in pots or cone-shaped nets which tangle crabs attracted to the bait within. There are strict limits on numbers of pots and the sizes of male mud crabs which can be kept — females are protected.

**Blue swimmer (sand) crabs** are caught in commercial pots or as bycatch in trawls (about 300t annually) and are important to recreational fishers. Most are caught in southern Queensland but about 18 percent from the GBR in the vicinity of Mackay and the Keppel Islands.

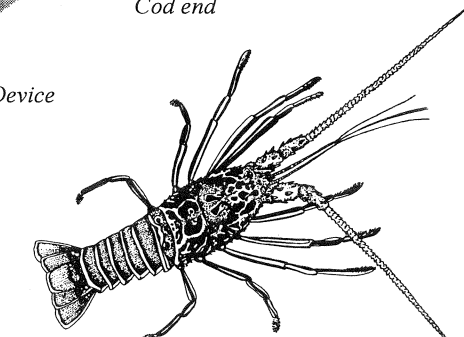
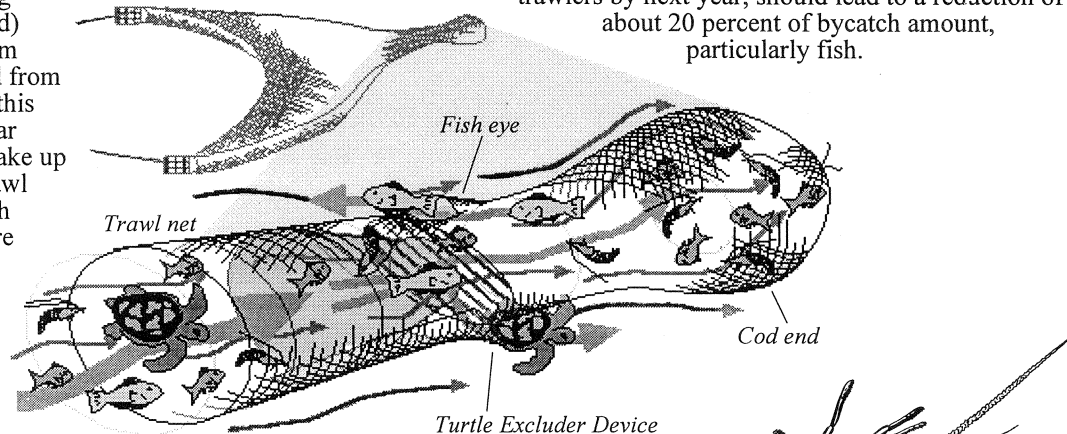
**Spanner crabs** are taken mainly in the southern GBR region, south of Bowen. Baited nets are used to tangle the crabs but they are sometimes caught in numbers in trawls.



The otter trawl is a tapering net which is dragged along the sea floor. Often several are used by each boat. This fishing method can result in a large amount of bycatch. For every tonne of prawns caught, 6-10t of other species may be discarded. A recent CSIRO/DPI study showed that 5-25 percent of all seabed life is removed in a single pass, about 50 percent in seven trawls and up to 90 percent in 13 trawls. However, it is estimated that less than one percent of trawled areas would suffer the most extreme pressure since only high-yielding areas are repeatedly trawled.

The results of the CSIRO/DPI investigation have been presented to the Queensland Fisheries Management Authority (QFMA) and have been taken into account in preparation of a Discussion Paper on management options for the East Coast Trawl Fishery. They will provide valuable guidance in finalising the Draft Management Plan.

Bycatch Reduction Devices (left), which should be installed on all trawlers by next year, should lead to a reduction of about 20 percent of bycatch amount, particularly fish.



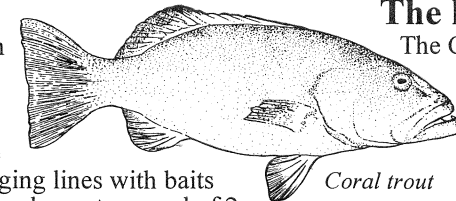
### Tropical rock lobsters

Fishing for tropical rock lobsters began in the Torres Strait in the 1960s. Freezer boats were introduced in the 1980s and now fish the reefs as far south as Princess Charlotte Bay; about 15 percent of the Australian catch comes from east coast reefs. Until recently, most were snap-frozen and exported as 'tails'. However, as air transport has improved, many are now exported live. This species does not enter traps so is fished by divers who free dive or use 'hookahs' — long tubes through which air is pumped from the surface.

## Line fishing

There are approximately 240 licensed operators in the principal Great Barrier Reef Line Fishery while approximately 1470 licence holders have more limited commercial access to those stocks.

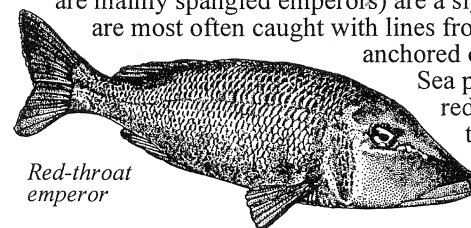
Most commercial fishing on the GBR is done using handlines, each with up to six baited hooks (maximum number within the GBRMP). Motors may be used to take the work out of hauling in the catch. Trolling, which entails dragging lines with baits or lures behind the boat as it moves along at a speed of 2-10 knots, targets pelagic (open water) species. Thick galvanised cables may be used for Spanish mackerel, one of the main trolling targets.



### The live fish trade

The Chinese and Japanese believe that, apart from the better flavour, eating freshly killed fish is good for the health and a long life — and they have been prepared to pay a high price. Groupers (especially coral trout) and wrasses are in most demand with coral trout fetching \$18-45 per kilo. Since the first live coral trout was exported in 1993, this sector of the reef-line fishery has grown, accounting for 15 percent of the total commercial catch of demersal reef fishes in Queensland in 1997. About 110 licensed reef-line fishing boats changed over to live fishing, earning about \$20 million per year. However, recent economic woes in Asia have since led to a downturn in this industry.

Coral trout are the Reef's most targeted fish — and the major Queensland commercial finfish; prices have increased by nearly 200 percent since 1992. Most are caught with handlines, off the reef crest. Red-throat (sweetlip) emperors, which comprise 90 percent of the emperor (*Lethrinus* sp) catch on the GBR (the rest are mainly spangled emperors) are a significant species. They are most often caught with lines from tender boats anchored over coral bommies.



Sea perches or 'red fish' — red emperors and saddle-tailed snapper (*Lutjanus* sp) — are also caught by line, usually at night.

Of the reef pelagic fish, Spanish mackerel are the most important, constituting about two-thirds of all mackerel species taken. Various whaler sharks are also caught in open waters (as well as in inshore nets, see right) as are tuna.

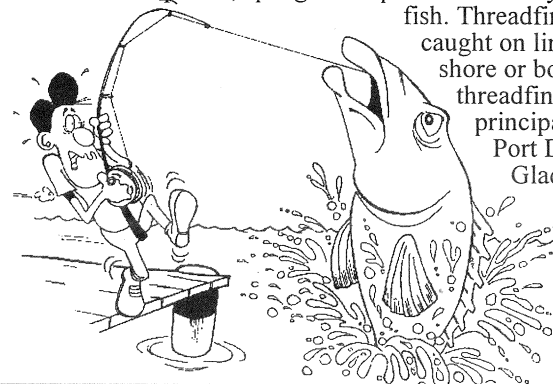
The Reef Line Fishery in Queensland is a licensed, limited entry fishery with restrictions on sizes of both boats used and of fish retained, and on the type of gear used. Fishing is prohibited on some reefs within the GBRMP — for details consult a zoning map available from GBRMPA or DEH offices. Commercial spearfishing, except for tropical rock lobster, is prohibited as is recreational spearfishing with SCUBA.

## Recreational fishing

A telephone survey in 1996 indicated that about 35 percent of people living on the coast adjacent to the GBR fish for recreation, most of them in saltwater.

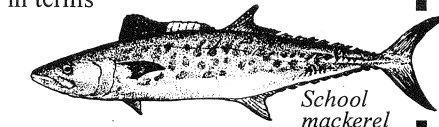
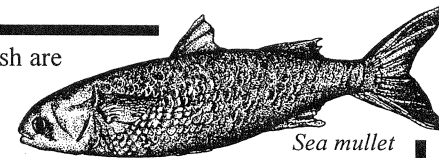
The actual volume of fish caught by recreational anglers on the GBR is extremely difficult to assess. A 1993 study estimated the total annual catch on the GBR from the 24 300 privately registered boats from Rockhampton, Mackay, Townsville and Cairns was between 3500t and 4300t (2.6-3.2 million fish).

On the reef, large numbers of coral trout and Spanish mackerel are taken with lines and rods by recreational fishers as well as red-throat emperors, spangled emperors and many other coral reef fish. Threadfin salmon are caught on lines from the shore or boat, blue threadfins being caught principally between Port Douglas and Gladstone.



### Net fishing

About 1400 tonnes of finfish are caught commercially in inshore waters each year. Most are netted in estuaries, using mesh nets which trap fish — notably barramundi, salmon and grunter — as they swim into them, or haul or seine nets which are set in an arc and dragged on to the shore. Mullet, whiting, flathead and bream are caught in this way. Barramundi are a principal target, with 131 tonnes landed in 1995 (down from a peak of 214 tonnes in 1991). Sea mullet (a popular 'fish-and-chip' fish) is now one of the largest catches (222t in 1995) exceeded only by sharks (mainly whalers) at 236t. King threadfin salmon are second only to barramundi in terms of value. Blue threadfin salmon, grey, school and spotted mackerels are also caught in nets.



Management restrictions, aimed at preventing overfishing, include limits on the numbers of commercial licences issued, fish size limits, area and seasonal closures and limitations of the type of gear — such as types of net, net length and depth and mesh size. There is concern over incidental capture of turtles, dugongs and dolphins as well as the effects of net fishing on biodiversity. South of Cooktown, recent bans and restrictions in 16 areas are aimed at protecting dugongs.

### Charter boat fishing

A total of 122 charter vessel operators hold permits to undertake fishing trips within the GBRMP. Popular fish, such as coral trout, are targeted, but a number of boats focus on game fishing — trolling for surface-feeding pelagic fish, usually with a line which is lighter than the targeted fish. The top target is black marlin which are attracted to areas of increased biological productivity at the edge of the continental shelf, in the northern GBR, where tidal jets, running through narrow passages between long reefs, pull cold, nutrient-rich water up from the depths.

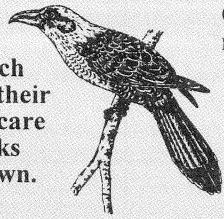
The first three marlin boats began operating out of Cairns in the early 1960s. In 1973 a 654kg black marlin was caught in the area — a record which still stands\*. By 1980 over one hundred 'thousand-pounders' — black marlin weighing over 1000lb (454kg) — had been recorded in Cairns. Nowadays, to conserve stocks, most marlin are released, some with tags. \*Game Fishing Association of Australia.





## Questions & Answers

**Q Why do the hosts of a cuckoo feed a nestling which is obviously not of their species — or even care for the egg if it looks different to their own.**



**A** The hatched cuckoo usually ejects the eggs and nestlings of its hosts, monopolising their attention and food. The foster parents don't seem to realise that the cuckoo is not their own bird and continue to feed the demanding nestling. Its cries are so insistent that even other birds sometimes pop food into its beak.

Some birds do eject cuckoos' eggs, showing that at least some can recognise them, but many do not. Possibly the chance of destroying or damaging their own eggs in the process prevents them from doing so, even when they are aware of the intruder. Later, they may not be able to distinguish between their own nestling and the young cuckoo — but if they were it could lead to problems. If the parents 'imprinted' on the first nestling to hatch as 'their' type of chick and evicted all others then, if their first hatchling was a cuckoo, they may subsequently evict all their own chicks from future nests, believing them to be strangers. It is therefore better for them to put up with the usurper in the interest of all their future legitimate offspring.

**A few more words on sea snakes.** Tim Ward, sea snake enthusiast, has shed a little more light on the subject of sea snake distribution. Apparently they tend to be more abundant on offshore reefs which is possibly because there are more avian predators such as white-bellied sea eagles on the inshore reefs.

Otherwise their patchy distribution remains a mystery. They may be abundant on some Swain reefs but not on apparently identical ones a short distance away. Distribution does not seem to be affected by temperature; they are relatively rare on the central GBR but more common in the south and the north. Fluctuating sea levels in the geological past may have affected distribution and they may still be in the process of colonising some areas.

Sea snakes are thought to have evolved from Australian terrestrial elapid (the most dangerously venomous) snakes, possibly on the northern Australian continental shelf. All species are found on Ashmore Reef, WA, which is known as 'Sea snake City'.

**Q I have heard that sprays, used for killing toads, may also affect native frogs.**

**A** Yes, sprays, such as Detol, may miss their target and affect the wrong animals — or may be accidentally sprayed on brown frogs which, at a glance, resemble toads.

Sprays are not only a cruel method for killing toads, but even in tiny quantities can cause a long horrible death for a frog. The most humane method of killing of toads is to search your garden with a torch at night and, wearing gloves, grab any you find. When you are sure of their identity, put them (in a good container) in the freezer overnight. Being cold-blooded, unlike mammals and birds they do not physically fight the drop in temperature and are dormant by the time the critical minimum temperature — the point at which the toad dies — is reached.

## Facts and stats

The 742 tourism operations permitted in the GBRMP cover 1674 individual craft including 328 bareboats, 127 aircraft, 17 cruise ships and 461 hire craft, such as dinghies and kayaks.

**The vast majority — 95 percent — of tourism use is centred in the offshore Cairns and Whitsunday areas — which accounts for just five percent of the Marine Park.**

A substantial number of tourism permits are not being used — 25 percent, Reefwide, and 46 percent in the Cairns Section did not operate in the year 1994-95. Since January 1996, over half of all craft permitted to operate in the Marine Park have not been used at all. Actual marine tourism has the potential to increase fivefold without the issue of any more permits.

**GBRMPA data returns show that day use visitors to the Reef rose about 30 percent per year between 1985 and 1988.**

Australia's largest bareboat fleet operates in the waters around the Whitsunday islands.

**Australian recreational fishing records for coral trout (23.6kg), threadfin salmon (13.6kg) and emperor (9.6kg) all come from Queensland.**

The only collection of wild pearl oyster shells in the GBRMP occurs for aquaculture broodstock. All pearls are grown in hatchery bred stock.

**Between 1968 and 1994, the number of registered small vessels adjacent to the GBRWHA increased by five times.**

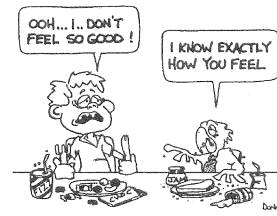
A licence buy-back operation, in early 1998, resulted in a reduction in the number of east coast commercial net endorsements from 1029 to 814.

**Beche-de-mer production has led to severe mangrove deforestation overseas; 10t of wood is needed to smoke 1t of beche-de-mer.**

Out of 340 fish species found living near the seabed in the lagoon, 245 species have been caught in prawn trawls. They are caught at the rate of 28kg per hour. Very few are of commercial or recreational value.

## Out and about

**You wouldn't raise your children on a diet of lollies ...**



**... so please don't feed our lorikeets in the same way**

**Artificial feeding of wild birds causes many problems:**

• Processed foods and drinks may be difficult for them to digest and are not sufficiently nutritious. As a result, their feathers may not develop properly, affecting their ability to fly.

• Disease may be passed easily from one bird to another. For example, the very serious and highly infectious beak and feather disease (runner syndrome), spreads rapidly among lorikeets fed together.

• Birds which are used to being fed may become demanding and aggressive — and they make a smelly mess.

**Don't be selfish ...**

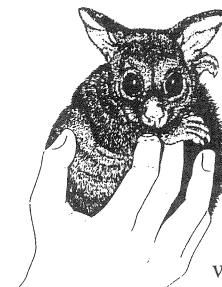


**... don't feed our lorikeets**

**A4-sized posters, asking people not to give food scraps to lorikeets, are now available.** These are based on the cartoon and article in *Tropical Topics* 52, p7, which detailed the damaging effects which artificial feeding can have on birds.

There is a choice of three types. One simply says, 'Don't be selfish ... don't feed our lorikeets', while another reads, 'You wouldn't raise your children on a diet of lollies, so please don't feed our lorikeets in the same way'. The third one is similar to the second, but details at the bottom the reasons why such feeding is damaging.

If you would like to have copies of these posters, which you are welcome to copy, enlarge, laminate and display in your resort, simply write to the editor — address at the back of the newsletter.



**The Far North Queensland Wildlife Rescue Association** has now opened a shop front at Unit 4, 114 Hoare St., Cairns. This is a centre where the public can bring sick, orphaned and injured native wildlife which they find. It is also a central meeting point for the voluntary carers where they can attend workshops and obtain supplies and there is a small vet clinic for native animals. The number of the new centre is 4053 4467 (24 hours).

Dr Garry Cross of the Department of Animal Health at the University of Sydney has forwarded his preferred **recipe for wild lorikeet feeding** — for those people who are *determined* to feed the birds and who can be *certain* of providing a regular supply and to keep feeding areas scrupulously clean to prevent spread of disease.

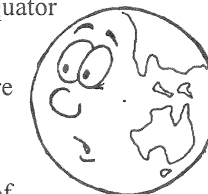
2 cups Heinz rice cereal  
2 cups rice flour  
2 cups canary egg and biscuit food  
1 cup glucose powder  
1 teaspoon multivitamin mix (ABDEExtra)  
1 dessertspoon pollen

Please bear in mind, however, that it is better *not* to artificially feed wild birds.

You should find in this issue of *Tropical Topics* a CRC Reef Research Centre 'Exploring Reef Science' order form. These fact sheets present the work of various CRC researchers in a digestible, 1-page (usually) format and are available free of charge. A number of these sheets have been used as reference sources in the preparation of this newsletter.

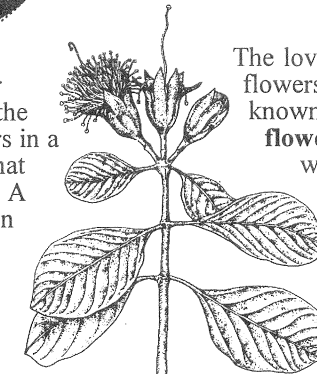
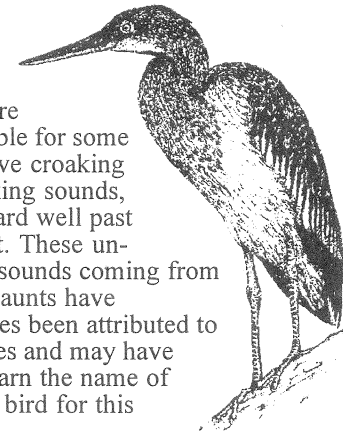
The earth's **tropics are getting smaller.** Year by year the tropics are converging on the equator and thousands of square kilometres of the earth's surface are passing into the temperate zone, according to NASA. Last year the tropic of Cancer moved another 14.7m south and the tropic of Capricorn moved the same distance northward. In all, almost 1100sq.km becomes officially 'temperate' each year.

The reason for this shrinkage is the changing obliquity of the earth, which is falling by about 47.5 arc seconds per century. This occurs because the gravitational effects of the sun, moon and other planets cause the earth's obliquity to oscillate with a period of about 41 000 years. From: *Sky and Telescope*, June 1998. *Science Week*, 8 May '98.



Nesting by the **great-billed heron**, a large and quite rare bird of quiet waterways in northern Australia, occurs during the wet season months. Successful breeding has been recorded in the Daintree River catchment, but nesting does not seem to be an annual event for this species. The brown and grey fledglings (below) actually look more colourful than the grey adult.

Great-billed herons are responsible for some impressive croaking and barking sounds, often heard well past midnight. These un-birdlike sounds coming from watery haunts have sometimes been attributed to crocodiles and may have helped earn the name of alligator bird for this heron.



The lovely but short-lived flowers of a mangrove known as the **red-flowered pornupan** will be scattering long red stamens on tidal waters. Flowering in this species frequently extends throughout the warmer months.

This pornupan is considered to have the most handsome flower of all mangroves, with a mass of stamens each about four centimetres long. When these stamens fall, the large green calyx lobes spread out like a star, with a disc-like fruit developing in the middle. A member of the family Sonneratiaceae, this species is called *Sonneratia caseolaris*.

### Please note

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## Tourist talk

ENGLISH	GERMAN	JAPANESE
economic value	wirtschaftlich Wert	keizaijou no kachi 経済上の価値
trawling	Schleppnetz-fischerei	sokobiki gyo o suru 底引き漁をする
tourism	Tourismus	kankou 観光
fishing alive	Fischerei lebendig	sakana tsuri 魚釣り
aquarium	Aquarium	ikita mamano 生きたままの
marlin	Schwertfisch	suizokukan 水族館
pharmaceutical drugs	Medizin	makajiki マジキ 調剤薬