

Discovery sessions at the GBR Aquarium, Townsville

2nd and 4th Sunday of each month
1.30-2.30 pm

For Aquarium members, discovery sessions are an opportunity to have an in-depth look at various marine topics and gain a greater appreciation of the marine environment and its inhabitants.

Cairns and Far North Environment Centre walks and talks

Bush foods

Dr Tony Irvine - slide talk
Wed. 17th Nov. 7.30pm
Cominos House, Greenslopes St. \$3

Looking for Light (Photography)

Kerry Trapnell - slide talk
Wed. 24th Nov. 7.30pm
Cominos House, Greenslopes St. \$3

Further info: Ph: (070) 321746

Reminder Interpretation Australia

National Conference
Embracing Interpretation in the Year of the Indigenous Peoples

Nov. 29th - Dec. 1st
University of Newcastle,
N.S.W.

Further information
Ph: (049) 215730/216787

Tourism liaison at GBRMPA

The Great Barrier Reef Marine Park Authority's extension unit has the task of establishing communication networks with the broad cross-section of user groups within the Marine Park. One of our most effective communication strategies is to employ specialist staff who have a strong working background within those particular groups. The Authority has already had considerable success with the commercial fishing industry by adopting this strategy.

Recently the Authority employed **Colette Pettersen** as a part time consultant to assist with the extension services being provided to the tourism industry. With eight years experience within the reef tourism industry Colette brings a wealth of knowledge to her position that should enhance the working relations between the management agencies and the operators.

She will have a range of responsibilities including the development of products and services being funded from the new environmental management charge and producing a permits information kit to help new operators through the permit application process. Colette can be contacted at the Authority on (077) 818811.

Bookshelf

Seagrasses of the Great Barrier Reef

Janet Lanyon
GBRMPA Special Publication Series (3) (1986)
Detailed species descriptions illustrated with excellent drawings.

Biological basis for managing dugongs and other large vertebrates in the Great Barrier Marine Park

Helene Marsh
GBRMPA (1992)
Volume 1, **Synthesis**, is the most generally useful part of this detailed five-volume study.

GBRMPA has produced brochures on **Turtles** and on **Dugongs** - available from DEH offices and from GBRMPA, PO Box 1379, Townsville, QLD 4810.

New release

Humpback Whales of Australia

Department of Environment and Heritage

Intended for researchers and whale watchers, most of the book is a catalogue, a 'family album', with over 1200 tail photos of individual whales plus information on where and when each whale has been seen. There are also background notes on research, management, biology, migration and photography. It is available for \$19.95 (plus \$3.50 postage) from Naturally Queensland, Ph: (07) 227 8186

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Opinions expressed in *Tropical Topics* are not necessarily those of the Department of Environment and Heritage.

While all efforts have been made to verify facts, the Department of Environment and Heritage takes no responsibility for the accuracy of information supplied in *Tropical Topics*.

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Wet Tropics theme next issue



Queensland
Department of
Environment and
Heritage

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Tropical Topics

An interpretive newsletter for the tourism industry



Seagrasses, dugongs and turtles

Vol 1 No. 16 November 1993

Notes from the Editor

It's spawning time again with creatures large and small reproducing. As long as the water temperature is 27°C or more, corals usually spawn three full days after the full moon, the event continuing over the following three nights. A full moon in late September, as was the case this year, can cause a split spawning. Corals in warmer waters, such as Magnetic Island, spawned, as expected, in early November. However, those in cooler areas such as the main reef and offshore islands are expected (hypothetically) to perform on the 2nd-5th of December. Factors other than the moon, such as tidal conditions, may also influence the exact timing.

Please keep clear of breeding animals. Nesting seabirds and turtles are particularly vulnerable. Birds' eggs, left unprotected by frightened adults, may quickly be killed by heat, cold or predatory birds. Chicks may become lost or exhausted. Turtles preparing to lay may be discouraged by lights, noise and sudden movements - if you want to watch by torchlight please wait until laying has begun. Dogs and wildlife, of course, never mix well.

Slick alert

A number of algal slicks have recently caused oil spill scares. Algal (and coral spawn) slicks are natural and can easily be differentiated from oil because they wash off the fingers with water. If you do discover an oil slick, please call GBRMPA on (077) 818811 or (077) 790 433 (24 hours).

The meadows of the sea

Cows grazing on rolling grasslands - beneath the sea! It sounds like a fantasy but we are talking about sea cows (dugongs) browsing on seagrasses! Although not exactly comparable with the Atherton Tableland, these marine grasslands are, nonetheless, now recognised as valuable agricultural areas.

It is estimated that seagrass beds rival rice paddies in their photosynthetic productivity (the amount of the sun's energy they convert to plant sugars) and play an extremely important role as nurseries for prawns and fish. Tiger prawns settle there at the post-larval stage (3-4 weeks) and remain until they become adults - juveniles are found nowhere else. Many endeavour prawns also spend their youth among the seagrasses. Together these species have an average annual landed value of \$1.2 million in the Cairns area alone.

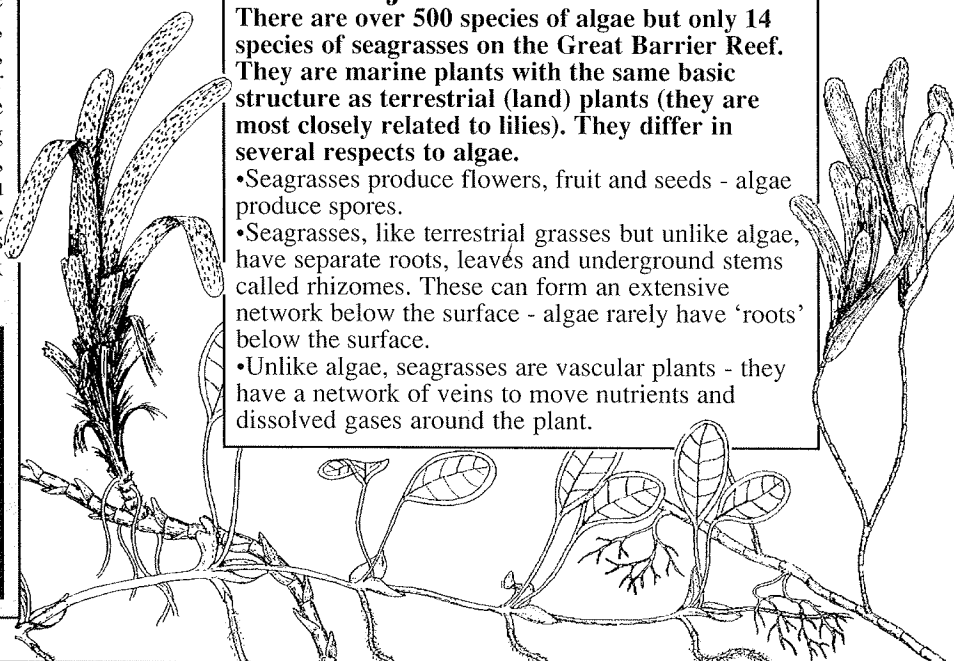
Seagrasses are also home to a number of fish species valued by fishers (as catch or bait) and by aquarists. Other fish species in seagrasses are part of marine food chains which lead to commercially fished species.

The value of seagrass meadows, however, cannot simply be calculated in dollars. They are an essential part of the marine environment. Not only do the plants stabilise sediment (keeping water clear) but they form the basis of a complex ecosystem supporting forms of life from dugongs to plankton. (More details on page 2.)

Not just another seaweed

There are over 500 species of algae but only 14 species of seagrasses on the Great Barrier Reef. They are marine plants with the same basic structure as terrestrial (land) plants (they are most closely related to lilies). They differ in several respects to algae.

- Seagrasses produce flowers, fruit and seeds - algae produce spores.
- Seagrasses, like terrestrial grasses but unlike algae, have separate roots, leaves and underground stems called rhizomes. These can form an extensive network below the surface - algae rarely have 'roots' below the surface.
- Unlike algae, seagrasses are vascular plants - they have a network of veins to move nutrients and dissolved gases around the plant.



Marine Parks

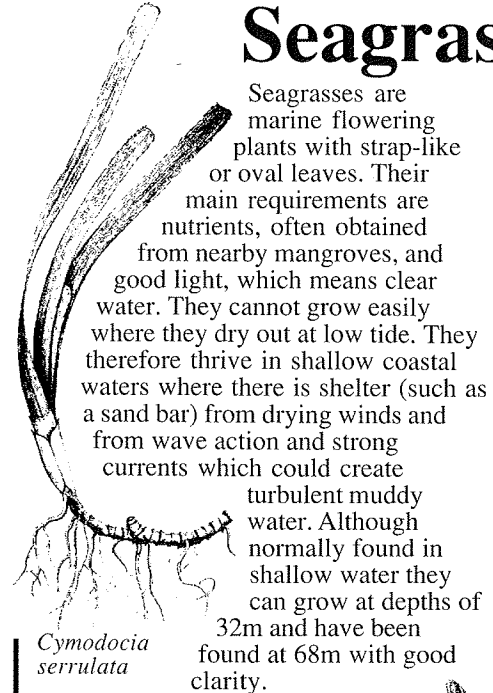


Great Barrier Reef
Marine Park
Authority



Queensland
Department of
Environment and
Heritage

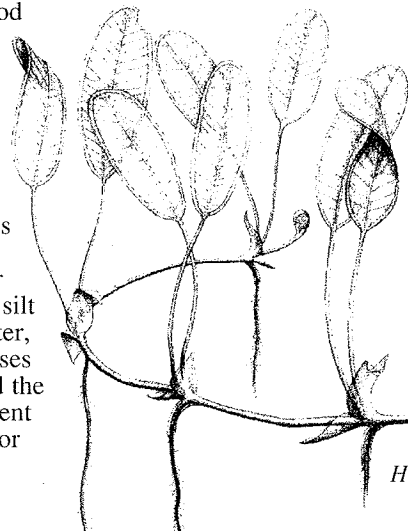
Seagrasses



Cymodocea serrulata

Seagrasses are marine flowering plants with strap-like or oval leaves. Their main requirements are nutrients, often obtained from nearby mangroves, and good light, which means clear water. They cannot grow easily where they dry out at low tide. They therefore thrive in shallow coastal waters where there is shelter (such as a sand bar) from drying winds and from wave action and strong currents which could create turbulent muddy water. Although normally found in shallow water they can grow at depths of 32m and have been found at 68m with good clarity.

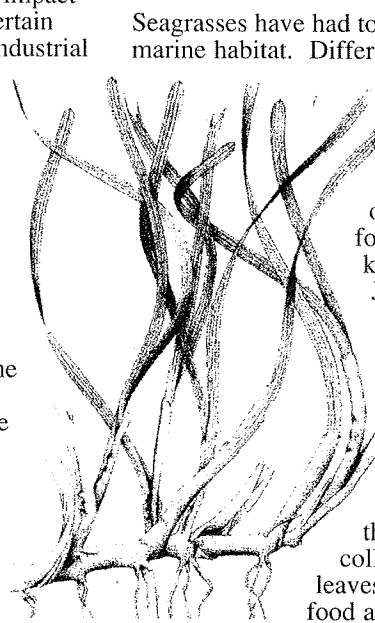
In mid 1992 fishers in the Hervey Bay area began to report large numbers of dead dugongs in the area. Researchers set out to check on the seagrass beds but where, in 1988, there had been 1000km of this dugong food they found none. In March 1992 the adjacent Mary River had flooded twice, carrying loads of silt into the sea. This clouding of the water, it is now assumed, killed the seagrasses by cutting out sunlight. Without food the dugongs soon followed, while the event probably led to a chain of disasters for numerous, less obvious, animals.



Halophila ovalis

As this experience showed, seagrasses are vulnerable. With or without human impact they come and go seasonally but certain activities put them at risk. Urban, industrial and agricultural runoff can have detrimental effects on seagrasses and the communities they support. Repeated trawling and outboard motors may damage the meadows while destruction of mangroves may disrupt the supply of nutrients. The removal of sandbanks can expose the plants to sediment-stirring waves and may cause the beds to drain and dry out at low tide. Now that the value of the marine grasslands have been recognised care is needed to ensure that coastal development takes this precious resource into account.

A life at sea



Zostera capricorni

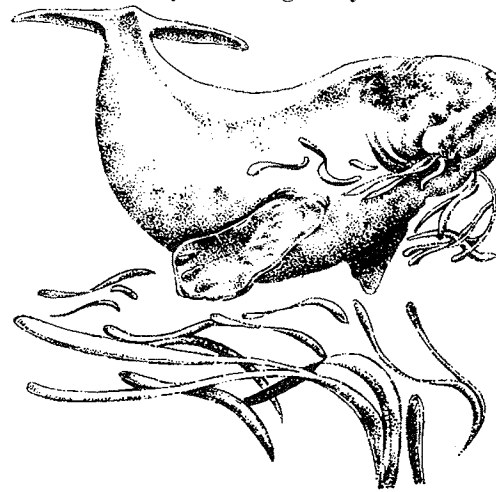
Seagrasses have had to adapt to their marine habitat. Different species have different salinity tolerance. Although low salinity is usually not tolerated well, one species can be found up to one kilometre up the Johnstone River.

While the roots, like those of land plants, serve to anchor the plants they are not necessary for water uptake. They share the task of nutrient collection with the leaves which can absorb food and water directly from the surrounding water.

Flowering generally takes place in winter or early spring. The flowers are fairly insignificant-looking structures. Most species rely on water to carry the pollen from the male to the separate female flowers. The resulting fruit are often carried some distance from the parent plant before the seeds are released. Flowering, however, is not common for most tropical species and the spread of seagrasses is largely through vegetative propagation by the growth and branching of rhizomes.

Dugongs

Although sometimes referred to as sea cows, dugongs are actually most closely related to elephants! It's rather hard now to imagine that the dugong inspired the mermaid myth among early sailors.



Perhaps the sailors had been at sea too long - a dugong most closely resembles a fat, slow-moving dolphin. An adult is up to three metres long with paddle-like flippers, a whale-like tail and a large mouth for grasping seagrasses. The upper lip is covered with sensory bristles which enable the dugong to find its food in muddy water.

Dugongs feed almost exclusively on seagrasses, tearing them out by the roots to take advantage of the starchy rhizomes. Eating up to 40kg a day, their progress is marked by a feeding trail and a silty plume in the water. Some algae as well as sea cucumbers and starfish have been found in their stomachs but it is not known if these were eaten deliberately or incidentally. On

average, dugongs have to surface to breathe every minute, although they can remain submerged for up to eight minutes. (Radio-tracking studies suggest that they spend more time at the surface at night.)

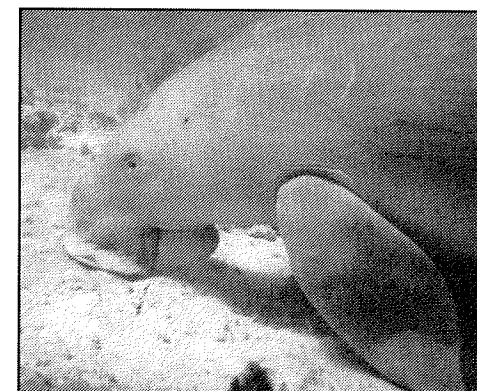
Dugongs can live for over 70 years, but breed slowly, not starting to produce calves until they are at least nine and sometimes 17 years old. The main breeding season is in the second half of the year. Usually a single calf is born and stays with its mother for at least 18 months. It suckles milk from mammary glands under each of the mother's flippers, a similar position to human breasts, as she swims or feeds. Females do not give birth again for another three to seven years. This means that population growth is likely to be 5% per year at best.

Dangers

Probably the greatest danger to the dugong is loss of habitat. Seagrasses have been lost in many parts of the world because of increased sedimentation in inshore water due to soil runoff resulting from bad farming practices. Trawling is now banned from many important dugong areas to protect the seagrass beds.

Nets are a danger for dugongs because, once caught, they find it difficult to surface for air and often drown. An unknown number are caught in commercial gill nets and since the mid 1960s over 500 have died in shark nets erected to protect bathing beaches.

A few dugongs also die when hit by boats. Such deaths can be reduced by the establishment of 'go-slow' zones in important dugong areas.



Where are they?

Dugongs occur in coastal and island waters of the Indo-Pacific, north and south of the equator, from East Africa to the Solomon Islands and Vanuatu. Unfortunately populations in most of the 43 countries which this area covers are believed to be small and in many areas they are extinct or close to extinction. The seagrass beds of the Great Barrier Reef region have been identified as major dugong habitats, home to 12 000 or more of the animals. In fact, the large numbers of dugongs in the Marine Park were mentioned as one reason for World Heritage Listing.

In the GBR dugongs are occasionally sighted in herds of up to several hundred animals but groups of under five, or mother and calf pairs are quite normal. Dugongs are generally seen in the vicinity of inshore seagrass beds although they have been sighted in coastal rivers up to 10km from the sea and as much as 60km offshore. They tend to avoid seagrass beds where there is a lot of boat traffic.

Of the GBR dugongs more than 80% occur north of Cooktown, about 20% of the total in the seagrass beds of the Starcke River region alone. By contrast, there is comparatively little seagrass in the Cairns Section and dugongs occur in low densities, occasionally being sighted in the mid-shelf reefs.

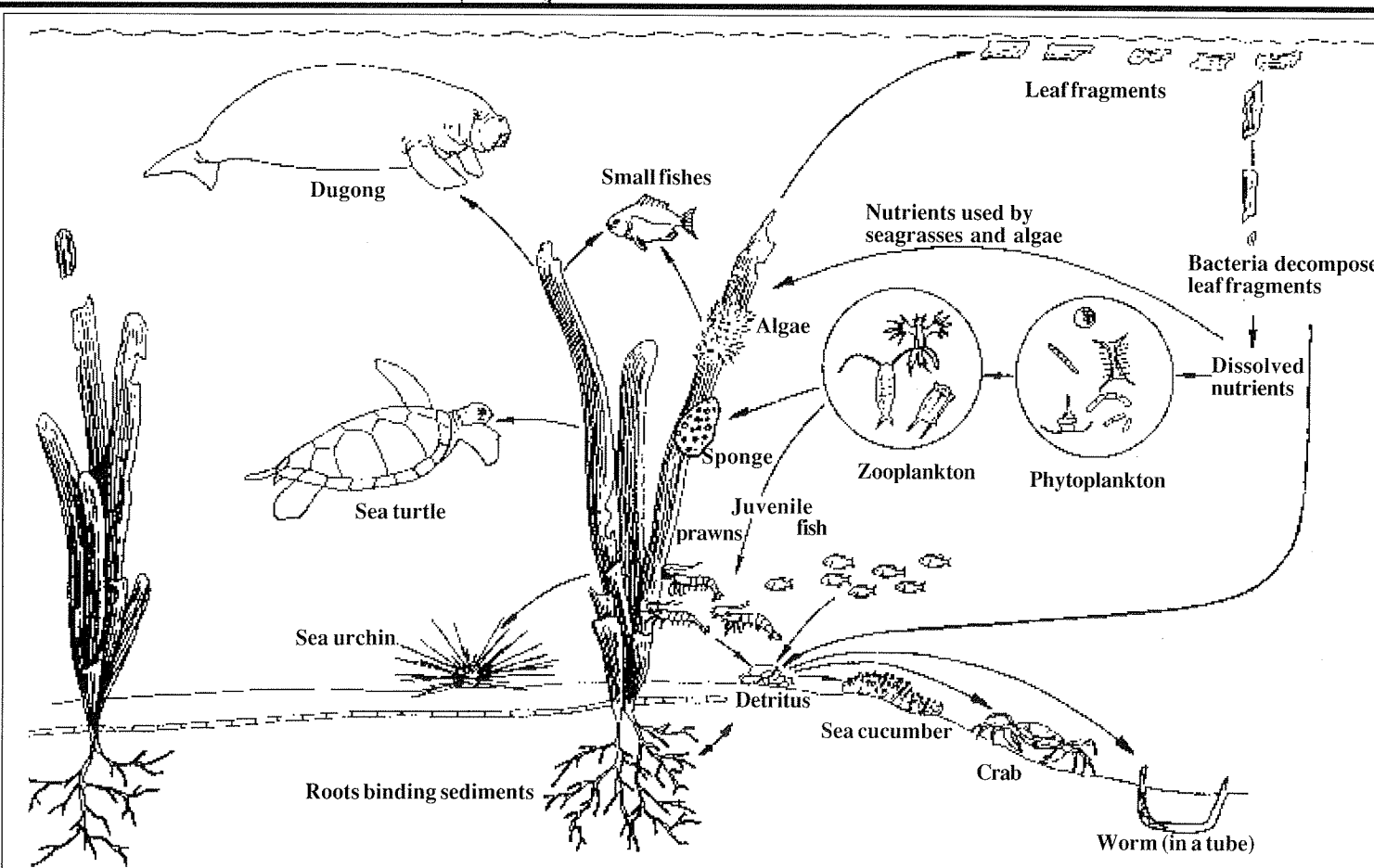
Important areas in the Central Section of the GBRMP are Hinchinbrook Island, Cleveland Bay, Upstart Bay and Edgumbe Bay and some offshore islands such as the Whitsundays. In the Mackay/Capricorn Section important dugong habitats include Port Newry, Llewellyn and Ince Bays, Shoalwater Bay, Port Clinton and Rodd's Bay. Dugongs are occasionally seen off some offshore islands.

Doug the dugong (left) is a periodic visitor to the tourists and crew on Moonlighting II at Upolu Reef, off Cairns. Thought to be a female separated from her herd, Doug is unusually friendly for a dugong.

Seagrasses as an ecosystem

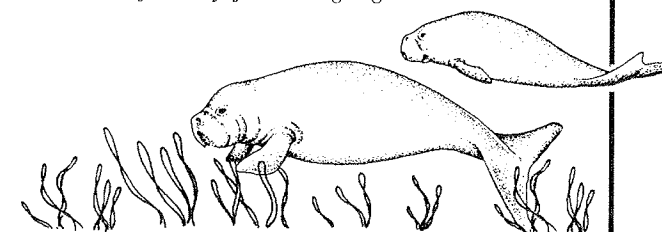
As can be seen from the diagram (left) seagrasses are central to a web of life. Only a few animals - dugongs, green turtles, sea urchins and some fish - have the ability to digest cellulose and feed directly on the leaves themselves. However, their usefulness does not end there. The leaves support an array of attached seaweeds and tiny filter-feeding animals like bryozoans, sponges, and hydroids as well as the eggs of ascidians (sea squirts) and molluscs. These, in turn, provide food for small fish (which, in their turn, feed the larger fish).

While living seagrasses might not be a popular item on the menu, dead seagrasses are a sought-after delicacy, forming the basis of lengthy food chains. Detritus from bacterial decomposition of dead seagrass plants provides food for worms, sea cucumbers, crabs and filter feeders such as anemones and ascidians. Further decomposition releases nutrients (nitrogen, phosphorous) which, dissolved in water, are re-used by seagrasses and phyto(plant)plankton. Plankton, both plant and animal, is a food source for juvenile prawns and fish, as well as other filter feeders.



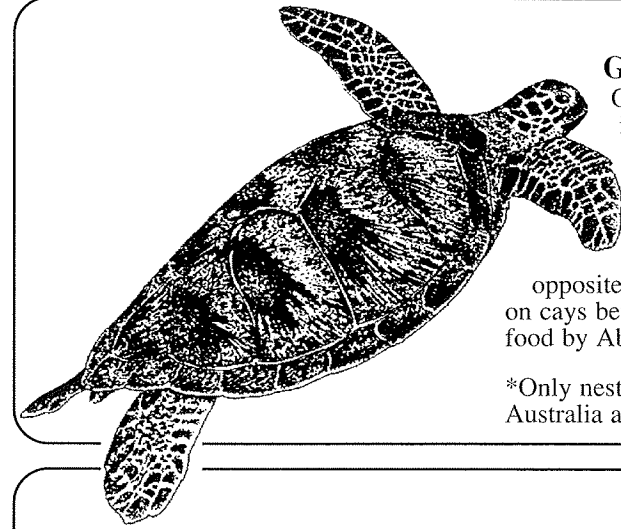
Trails in the seagrasses

Dugongs create feeding trails in seagrasses where they have moved along pulling out the plants by the roots. These trails tend to be serpentine - straight lines of more than about 10 metres are likely to have been created by an outboard motor. Seagrasses which have been grazed by turtles tend to have a mowed appearance as turtles crop the leaves of the plants instead of pulling them out entirely.



Turtles

Six species of sea turtle are present in Australian waters. Three - the green, loggerhead and hawksbill turtles - are more commonly seen on the shores, islands and reefs while the other three are rarely encountered.



Green turtle

One of the most commonly seen turtles in Australian waters, the green turtle, is about 1m in length and weighs 150kg or more. Its shell (carapace) is generally dark green-brown and it has a small head. It is a vegetarian, feeding on seagrasses and algae.

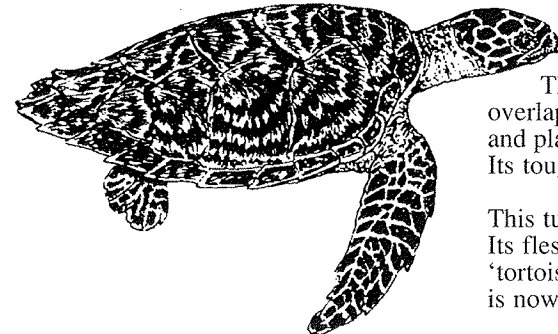
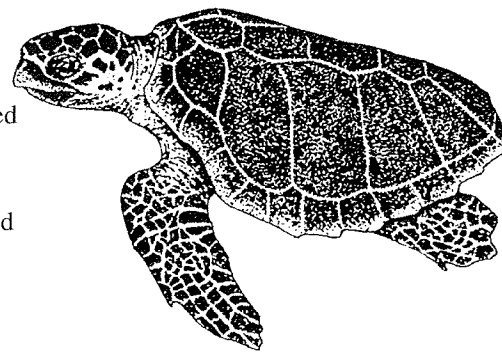
Green turtles have two main nesting areas*, one in the Capricorn-Bunker Group of islands, in the southern Great Barrier Reef, and the other, at the opposite end of the Reef, at Raine Island and nearby cays. There is also some nesting on cays between. The females of this species are particularly sought after as a source of food by Aborigines and Torres Strait islanders.

*Only nesting areas in Queensland are mentioned. Many species also nest in Western Australia and the Northern Territory.

Loggerhead turtle

This turtle is slightly smaller than the green turtle. Its carapace is longer than it is wide and is red-brown to brown in colour. Its head is relatively large. Loggerheads feed on molluscs and crustaceans found in sandy areas, crushing them with thick jaws.

Loggerhead turtles concentrate their nesting in the southern end of the Great Barrier Reef in three principal locations: the Capricorn-Bunker Group of islands, the mainland coast near Bundaberg and the Swain Reefs islands.



Hawksbill turtle

This is a smaller turtle, adults measuring 70-90cm in length, with thick overlapping scales on its brown-black carapace. It feeds on sponges and other animals and plants that live on the reefs, searching among corals with a long beak-like mouth. Its tough shell protects the turtle from injury in the reef environment.

This turtle nests on islands of the northern Great Barrier Reef and the Torres Strait. Its flesh is not widely eaten but its attractive shell is harvested in some countries for 'tortoiseshell' products. (Domestic and international trade in all wild turtle products is now prohibited.)

Flatback turtle

This intermediate-sized turtle has a soft grey carapace which feels greasy to the touch. It is, as the name suggests, relatively flat with distinctive upturned edges. It is believed to be carnivorous.

While other species breed elsewhere in the world the flatback turtle is uniquely Australian, living in the shallow water areas between the reefs and in the Gulf of Carpentaria, nesting on Queensland beaches and islands from Bundaberg to the Torres Strait. The flatback turtle is classified as vulnerable to extinction.

Leatherback turtle

This is the largest marine turtle, adults weighing over 750kg and reaching lengths of 1.75m - about the size of a kitchen table! Its white-spotted black carapace has distinctive white-topped ridges and is leathery to the touch. This giant among turtles feeds mainly on jellyfish. It nests only in very low numbers on a few Australian beaches but sometimes may be seen along the Reef.

Olive (Pacific) ridley turtle

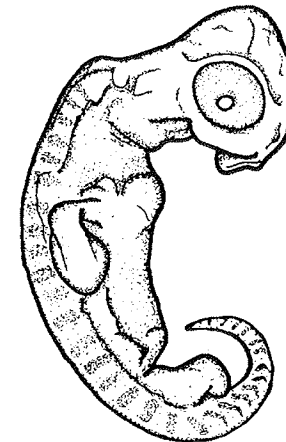
Adults of this, the smallest sea turtle, weigh a mere 50kg and are under 1m long. It is not commonly seen but nests in low numbers along the Gulf Coast of Queensland. It eats crustaceans.

Don't litter the seas

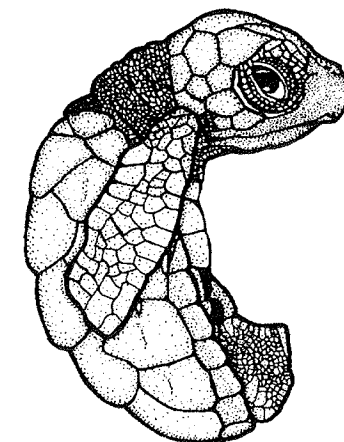
Turtles often mistake plastic for food - a floating bag looks just like a tasty jellyfish - but they are choked and killed by their mistake. They also become entangled in abandoned fishing nets. Please don't create turtle hazards.

Within the egg - a tale of tiny turtles

The laying of eggs is not an annual event for female turtles. The average female spends several years in the feeding areas building up energy for the next reproductive effort. As she prepares to breed the follicles (early egg yolks) in her ovaries grow from about 3mm to 2cm in diameter (depending on species). The turtle then migrates to the mating areas near nesting beaches.



Loggerhead turtle embryo about one-third of the way through incubation. Note carapace development along the side of the body is beginning and the paddle-like front flipper.



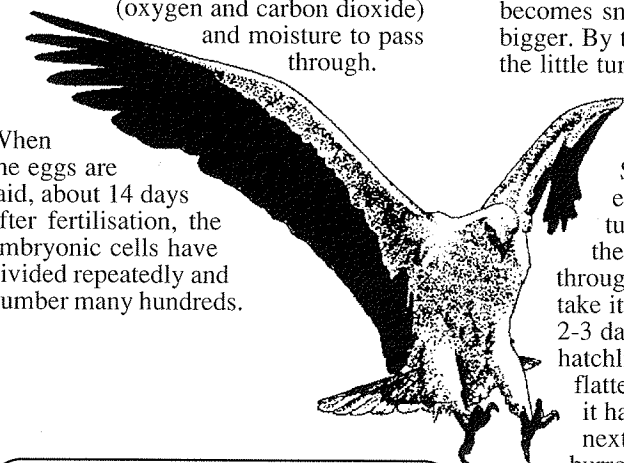
Hawksbill turtle embryo, nearly 70% of the way through incubation. Formation of the body scales and carapace is complete; body pigmentation is beginning.

The female mates with a number of males about a month before she begins laying eggs. The sperm are stored at the top end of the oviduct and fertilise the follicles as they are released from the ovary in batches. Each fertilised follicle then becomes the yolk of the egg, which is the food supply for the developing embryo. As the yolk moves down the oviduct special cells surround it with a gelatinous covering - the albumen. This watery protein mixture provides essential moisture and insulation for the embryo.

Now other cells begin to lay down the inner shell membrane which supports the shell itself. This stage is reached within 36 hours of the follicle leaving the ovary. The

production of the egg shell, by another set of cells, requires a further 7-9 days. The inner membranous layer and the outer calcium layer together form a soft pliable wrapping around the contents of the egg. Like the harder shell of a bird's egg, it allows respiratory gases (oxygen and carbon dioxide) and moisture to pass through.

When the eggs are laid, about 14 days after fertilisation, the embryonic cells have divided repeatedly and number many hundreds.



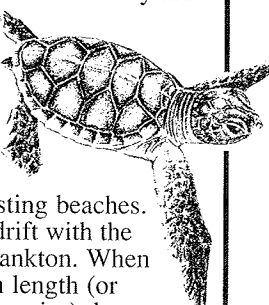
Into the world

Some 6-9 weeks after the eggs were laid the hatching turtle, using the sharp point on the end of its nose, tears a hole through the membranes and shell to take its first lungful of air. After a 2-3 day struggle with the shell the hatchling frees itself and its body flattens from the curled position it had inside the egg. During the next 2-5 days all the hatchlings burrow upwards together. They

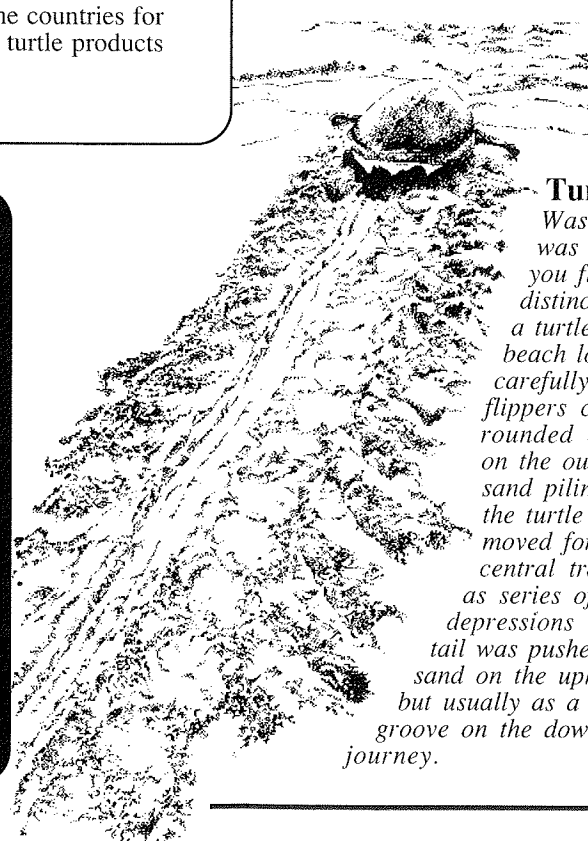
then wait, just under the surface of the sand, until the temperature of the sand falls (usually after dark) before emerging *en masse* and scrambling across the beach to the sea. They run the gauntlet of predatory crabs, birds, goannas, pigs and domestic pets. Once in the sea many are then lost to fish such as cod, grouper and sharks.

The lost years

Very little is known about young turtles after they leave the nesting beaches. It is thought that they drift with the currents, feeding on plankton. When they are about 30cm in length (or bigger, depending on species) they appear in the adult feeding areas.



Adapted from articles in Coralines by Margaret Card and Jeff Miller Q.DEH.



Turtle tracks

Was it coming or was it going? If you find the distinctive track of a turtle on the beach look at it carefully. The flippers created the rounded depressions on the outside, the sand piling up behind the turtle as she moved forward. The central trail appears as series of finger-like depressions where the tail was pushed into the sand on the uphill journey but usually as a continuous groove on the downhill, return, journey.

Questions & Answers

We have had feedback on a couple of questions answered recently in *Tropical Topics* 14.

Geoff McClure of Hartley's Creek Crocodile Farm has elaborated on the question, **What specific temperatures encourage estuarine crocodiles to climb from the water and sunbake?**

Crocodiles are ectothermic reptiles, which means that they use their immediate surroundings to regulate their body temperature (thermoregulation). Although normally referred to as 'cold-blooded', 'solar-heated' might be a better description.

The scutes, or bumps, on a crocodile's back act as solar panels - crocodiles often bask at right angles to the sun to gain maximum energy. These scutes are serviced by a rich blood supply. By increasing the flow of blood to the skin, through a faster heart rate, a basking animal may heat faster.

The reverse is true; a reduced heart rate and decreased flow of blood will slow down the cooling process. Large ectothermic animals are able to conserve body heat very efficiently by virtue of their body mass because they cool slowly. At Hartley's Creek 5m crocs have been observed on land over night at an air temperature of 13°C although the water temperature was 20°C.

A crocodile's head, being smaller than its body, heats up quicker during basking. To avoid overheating such a vital organ as the brain, humans thermoregulate by sweating. A croc, however, cannot do this because it has a waterproof skin. Instead it 'gapes', or holds its mouth open, letting cooling air flow over the only thin skin it has - the inside of its mouth.

Body temperature also dictates the quantity of food consumed. The process of digestion requires constant heat. If this is not available the croc will not eat, or regurgitate food rather than let it rot in its belly.

It is difficult to give a specific temperature that will influence crocodiles to bask, but several environmental factors are relevant. These include air temperatures, water temperatures (which vary with depth) and substrate temperatures (shallow still water on black estuary mud will be considerably warmer than flowing water on sand). During the last winter estuarine crocs on the Daintree River appeared to be basking more than in previous years. This is thought to be because of lower than normal water temperatures, caused by winter rain, and a lack of sun which meant that they had to bask for longer to accumulate sufficient warmth.

In another answer we stated that **rifle birds** were named because of their rifle shot-like calls. An alternative explanation has since come to light. It is said that the birds were given their name due to the similarity between their plumage and the uniform of rifle regiments of the British army in the 1820s.

While on the subject of bird-name origins, apparently the **Regent bowerbird** was named, about 1812, after the Prince Regent (later George IV). The **rosella**, which was first found in the area of Rose Hill (now Parramatta, but named, in 1788, after George Rose, secretary to the British Treasury) was originally the **Rose Hill parrot**, later the **Rosehiller** and finally the **rosella**. The **emu**'s name is derived from the Portuguese word '*ema*' which means any large bird. *Acknowledgments to Peter Shanahan, Cairns Botanic Gardens*

Facts and stats

While algae evolved over two billion years ago, seagrasses appeared relatively recently, during the Cretaceous period, about 70-100 million years ago.

In a study of 876ha of seagrasses in the Cairns area 134 species of fish were found. The density was estimated at about 9000 fish per hectare.

Growth of tropical seagrasses is much faster than those in temperate seas. In South Australia holes made in the seagrass beds in wartime are still visible; in the tropics the holes would have grown over within a month or so.

There are only four surviving members of the sea cow (sirenian) family. Apart from the dugong there are the West Indian, the West African and the Amazonian manatees. These three species all spend some time in fresh water making the dugong the only strictly marine herbivorous mammal. Its closest known relative, the eight-metre Steller's sea cow, was hunted to extinction in the 18th century.

Turtles bred in captivity have been known to reach maturity in nine years but in the wild 30 years or even 50 years is considered more normal. An adult male turtle can be identified by its long tail and the long claws on its front flippers.

Turtle eggs vary in size from the golf ball-sized (2.5cm diameter) egg of the hawksbill turtle to the billiard ball-sized (5cm diameter) egg of the leatherback turtle. The mother will lay three to seven clutches of eggs during a nesting season.

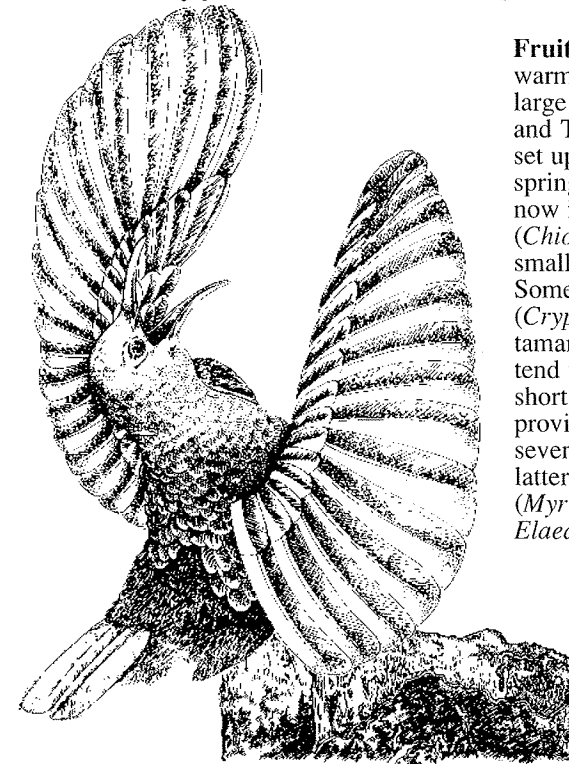
Female turtles migrate distances of from a few hundred kilometres to thousands from the feeding grounds to nesting areas. There are several records of one green turtle which swam 2 000km from marine pastures in Princess Charlotte Bay (on Cape York) to lay her eggs near Gladstone.

The main dangers to turtles are trawling (prawn) nets and shark nets as well as changes to nesting beaches such as rock retaining walls. Lights behind the beach can disorient the hatchlings which instinctively head towards the brightest area, normally the sea.

Nature notes

A diary of natural events creates a pleasing journal which grows richer with the passage of time. Watching for the recurrence of an event after noting it in a previous year, and trying to understand what could have caused changes in timing, is intriguing.

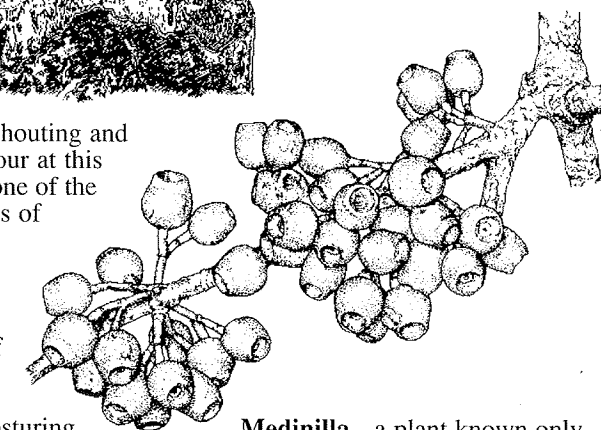
These notes are from the author's own notebook, or were offered by researchers and fellow naturalists. Readers will, inevitably, note variations between their observations and those appearing here. The editor will be delighted to hear your news. If you do not keep a nature diary perhaps this will inspire you to begin one. This column will be enriched by your contributions. Items published will be fully acknowledged.



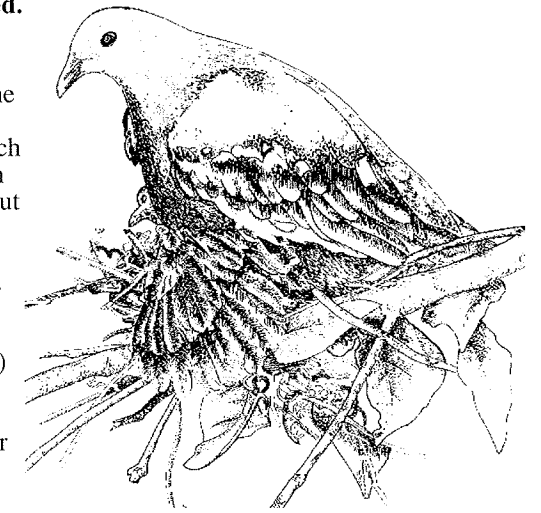
Male riflebirds will be shouting and dancing with utmost vigour at this time of year, producing one of the grand avian performances of Australia. Mature males display their wonderful iridescent colours and arresting wing slapping posturing from the top of dead trees or other suitable exposed sites, in order to win mates. A posturing male announces itself with frequent harsh calls, so a good way to see a display is to move quietly towards a spot from which repeated calling is heard. The male takes no part in nest building or rearing of young.

Two years ago the **yellow bean** flowered profusely north and south of Daintree River, providing red splashes on the ridges and hills. Last year only an occasional tree blossomed, but if yellow bean (*Ormosia ormondii*) is going to bloom this year it should be happening about now. The pink flowers are followed by stubby pods containing one or two distinctive hard red seeds, which are very noticeable among the fallen debris of the forest floor.

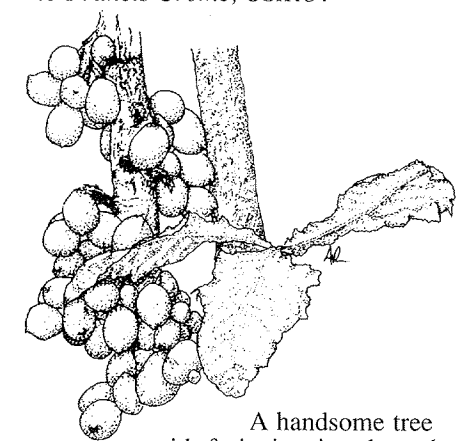
Fruit is in good supply during the warm months, which is timely for the large numbers of shining starlings and Torresian imperial pigeons which set up home in the Wet Tropics each spring. Common fruits ripening about now include native olive (*Chionanthus ramiflora*) and its smaller relative, *Linociera sleumeri*. Some trees like the northern laurel (*Cryptocarya hypospodia*) and pink tamarind (*Toechima erythrocarpum*) tend to ripen all their fruits within a short space of time, while others provide a scattering of ripe fruit over several months. Examples of the latter include native nutmeg (*Myristica insipida*) and the vine *Elaeagnus latifolia*.



Medinilla - a plant known only from rainforests of North Queensland and Cape York - will be showing young fruit in October-November. The immature fruit is a delightful goblet shape, bright pink or red in colour. The red does not signify ripeness, however, because the fruits change to a less eye-catching mauve when ripe. The fruits are eaten by birds and are edible for humans, but the taste is unlikely to inspire rapture. The tiny seeds can start life as an epiphyte or as a vine at the base of a tree. The botanical name *Medinilla balls-headleyi* commemorates two men, a Spaniard named Don Jose de Medinilla y Pineda and a Dr Walter Balls-Headley. Medinilla flowers - a delightful white to pink with a classic five-petal form, were on display in early September this year.



Wompoo pigeons were quarrelsome during August while mates and nesting sites were being sorted out but by now many are raising a single chick. Wompooos are fruit-eating pigeons which digest only the flesh of fruits they swallow. Consequently the ground beneath their nest platform soon becomes spattered with seed which provides a nice sample of fruit eaten during the breeding and nestling raising season. Fruit of the laurel family ranks high among the many species eaten by wompooos, but figs and many others are important, including the berries of white cedar (*Melia azedarach*). *Acknowledgments to Francis Crome, CSIRO.*



A handsome tree with fruit ripening through the spring and early summer is the **Davidson plum** (*Davidsonia pruriens*). The attractive and deliciously acid fruit has many fanciers among birds and mammals, one of which is Bennet's tree-kangaroo, an observation recorded by Les Moore (CSIRO) during field work in the Cape Tribulation area.

Tourist talk

ENGLISH	GERMAN	JAPANESE
seagrass	seegrass	kaiso 海草
algae	algen	so rui 藻類
flowers	blumen	hana 花
prawns	garnelen	kuruma ebi くるま海老
rhizomes	ableger/seitentriebe	chika kei 地下茎
dugong	seekuh	dugong ジュゴン
turtle	meeresschildkröte	kameh 亀
eggs	eier	tamago 卵
temperature	temperatur	on doh 温度
track/trail	weg/pfad	ahto 跡