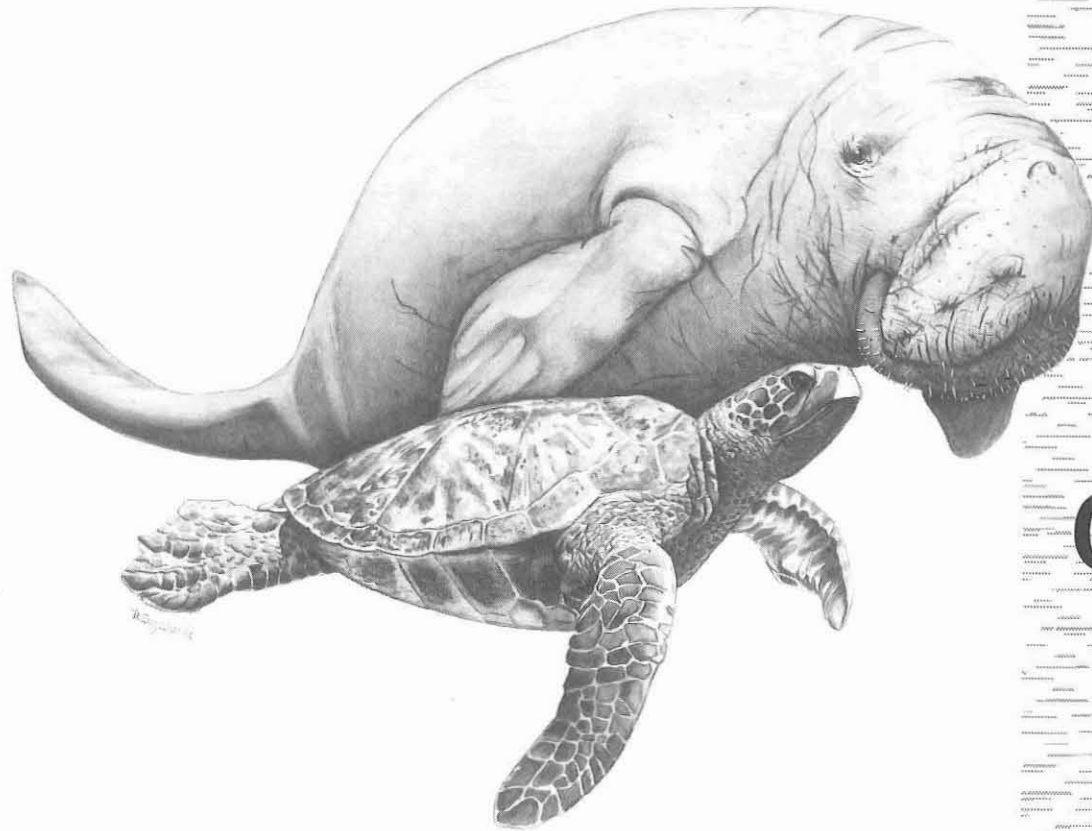


**TURTLE
AND
DUGONG
CONSERVATION
STRATEGY
FOR THE
GREAT BARRIER REEF
MARINE PARK**



Great Barrier Reef Marine Park Authority

ISSUES PAPER FOR PUBLIC COMMENT



**TURTLE
AND
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CONSERVATION
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FOR THE
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MARINE PARK**



**Great Barrier Reef
Marine Park
Authority**

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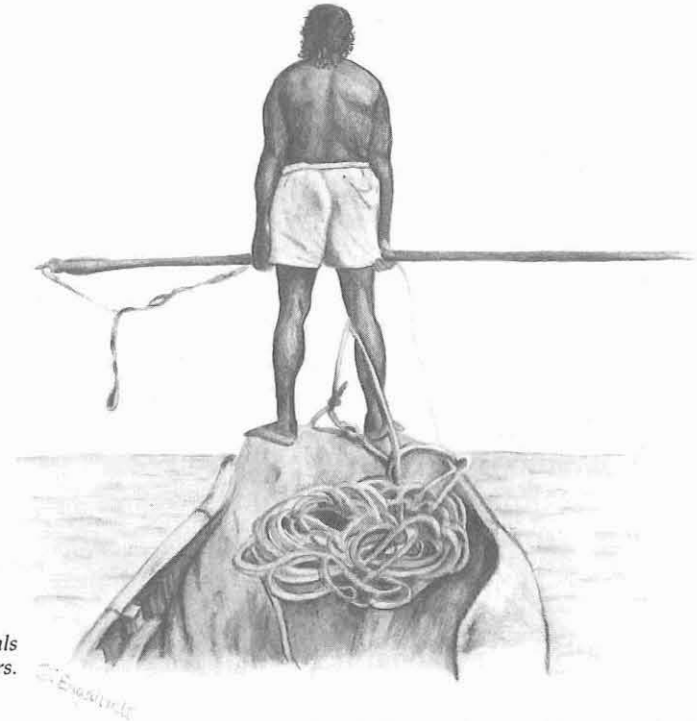
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Traditional hunting of turtles and dugongs has been an important custom of Aboriginals and Torres Strait Islanders for many thousands of years.



Abbreviations used in this document:

• AMPTO	Association of Marine Park Tourism Operators	• JCUNQ	James Cook University of North Queensland
• ANCA	Australian Nature Conservation Agency	• OR2000	Ocean Rescue 2000
• ANZECC	Australian and New Zealand Environment and Conservation Council	• QB&FP	Queensland Boating and Fisheries Patrol
• A&TSI	Aboriginal and Torres Strait Islander	• QCFO	Queensland Commercial Fishermen's Organisation
• Conservationists	Conservation groups, at both the national and international scale	• QDEH	Queensland Department of Environment and Heritage
• CSIRO	Commonwealth Scientific and Industrial Research Organisation	• QDPI	Queensland Department of Primary Industries
• DFAT	Department of Foreign Affairs and Trade	• QDoT	Queensland Department of Transport
• GBR	Great Barrier Reef	• QFMA	Queensland Fish Management Authority
• GBRMP	Great Barrier Reef Marine Park	• Researchers	Scientific community, whether or not they are employed by an agency
• GBRMPA	Great Barrier Reef Marine Park Authority	• Scientific Community	Biologists, ecologists, anthropologists, and geographers involved in research related to turtles and dugongs
• GBRR	Great Barrier Reef Region	• SPREP	South Pacific Regional Environment Programme
• GIS	Geographic Information System	• T&D Review Group	Turtle and Dugong Review Group
• IUCN	International Union for the Conservation of Nature and Natural Resources	• WWF	World Wide Fund for Nature



Great Barrier Reef Marine Park Authority

GOAL AND AIMS

GOAL

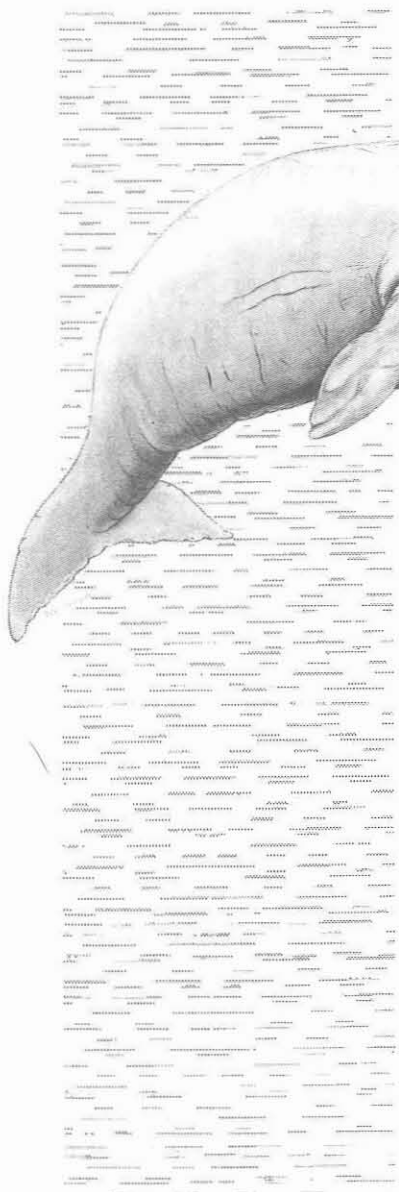
To provide for the protection, wise use, understanding and enjoyment of the Great Barrier Reef in perpetuity through the care and development of the Great Barrier Reef Marine Park.

AIMS

These aims are subordinate to the primary goal and must be read in conjunction with it and with each other.

- To protect the natural qualities of the Great Barrier Reef, while providing for reasonable use of the Reef Region.
- To involve the community meaningfully in the care and development of the Marine Park.
- To achieve competence and fairness in the care and development of the Marine Park through the conduct of research, and the deliberate acquisition, use and dissemination of relevant information from research and other sources.
- To provide for economic development consistent with meeting the goal and other aims of the Authority.
- To achieve integrated management of the Great Barrier Reef through constantly seeking improvements in coordinated management.
- To achieve management of the Marine Park primarily through the community's commitment to the protection of the Great Barrier Reef and its understanding and acceptance of the provisions of zoning, regulations and management practices.
- To minimise the cost of caring for and developing the Marine Park consistent with the goal and other aims of the Authority.
- To minimise regulation of, and interference in, human activities, consistent with meeting the goal and other aims of the Authority.
- To achieve its goal and other aims by employing people of high calibre, assisting them to reach their full potential, providing a rewarding, useful and caring work environment and encouraging them to pursue relevant training and development opportunities.
- To make the Authority's expertise available nationally and internationally.
- To adapt actively the Marine Park and the operations of the Authority to changing circumstances.

FOREWORD



The present Strategy has been prepared to promote broad-reaching conservation of dugong and marine turtle populations in the Great Barrier Reef Region.

Similar conservation and management issues exist in other parts of these species' ranges, within and outside areas of Queensland or Australian Government jurisdiction. This strategy must be viewed in context of existing and planned management actions by other agencies. That is, in recognition that the conservation of turtles and dugongs in the Great Barrier Reef Region is only part of a much larger picture of necessary conservation.

The Queensland Department of Environment and Heritage (QDEH) has cooperated and assisted with the preparation of the present Strategy. QDEH is currently preparing Conservation Plans for dugong and marine turtles to be given effect under the *Nature Conservation Act 1992*. This Strategy and the QDEH Conservation Plans have been framed to complement and assist, rather than contradict, each

other. This Strategy is strategic in its focus, and aims to put in place a set of procedures, reviews and actions (many voluntary), to resolve management difficulties across the entire Great Barrier Reef Region and many diverse interests. The QDEH Conservation Plans are more specific and present immediate actions directed at individual issues, but are consistent with the strategic approach contained in this document.

The Commonwealth Government, through the *Endangered Species Protection Act 1992* and in cooperation with other state and regional governments, is moving towards a set of management measures that will be consistent across state and neighbouring international boundaries where possible. A forum to be convened by the Australian and New Zealand Environment and Conservation Council is planned to facilitate such an approach. This Strategy, in cooperation with the QDEH Conservation Plans, should serve as a model for such measures in the future.

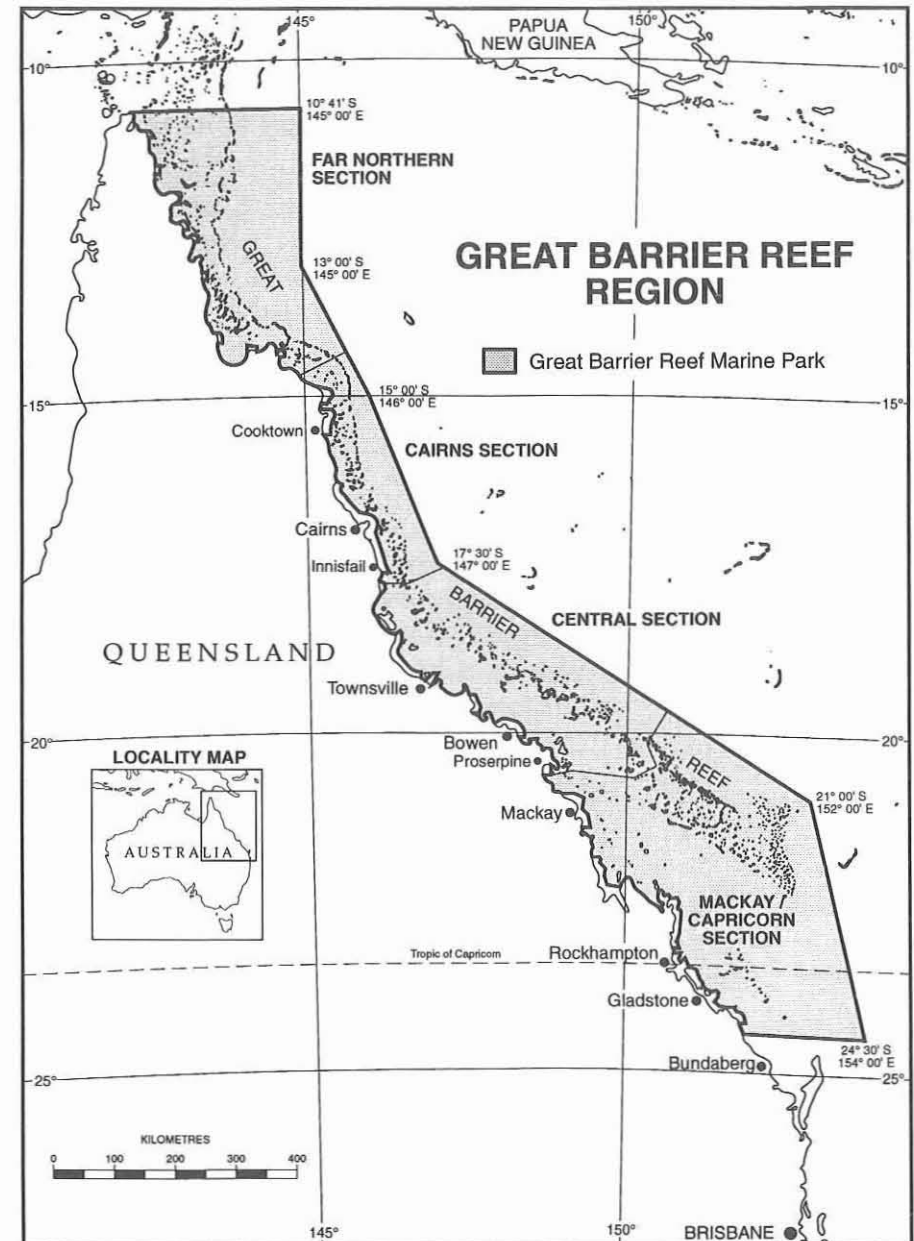
INTRODUCTION

The Great Barrier Reef Region

Large numbers of turtles and dugongs inhabit the Great Barrier Reef Marine Park (GBRMP) (see Maps 1 and 2), with studies indicating that they are amongst the largest remaining populations in the world. The estimated dugong population for the Great Barrier Reef Region is 12 000, occurring largely in northern areas of the GBRMP. The diversity of habitats in the Marine Park offers foraging grounds for marine turtles and supports internationally significant breeding aggregations of four species (green, loggerhead, hawksbill and flatback). The migratory nature of turtles, as they travel across state and international boundaries, makes them a nationally and internationally shared resource. Conservation of these populations requires the development of effective, concise and widely accepted strategies, to be managed by several agencies with the cooperation of the public. Effective management must be cooperative across regional, state, national and international administrative boundaries.

Conservation status

Worldwide, the dugong is listed in the 1990 IUCN Red List of Threatened Animals as being *vulnerable* to extinction. The species is likely to move into the *endangered* category in the near future if the factors causing a decline continue operating. Most species of marine turtles are listed as being *endangered* and by definition are in danger of becoming extinct if the causal factors continue operating. The exception is the loggerhead turtle, which is listed as being *vulnerable*.



Map 1: Boundaries of the Great Barrier Reef Marine Park

The Commonwealth *Endangered Species Protection Act 1992*, lists the green, hawksbill, olive ridley and leatherback turtles as being *vulnerable* to extinction, while the loggerhead is listed as being *endangered*. Dugongs are not listed by Australia, however both marine turtles and dugongs are protected by Queensland and Commonwealth legislation. The Queensland Government's *Nature Conservation Act 1992* lists dugongs and all species of marine turtles found in Queensland waters as protected wildlife.

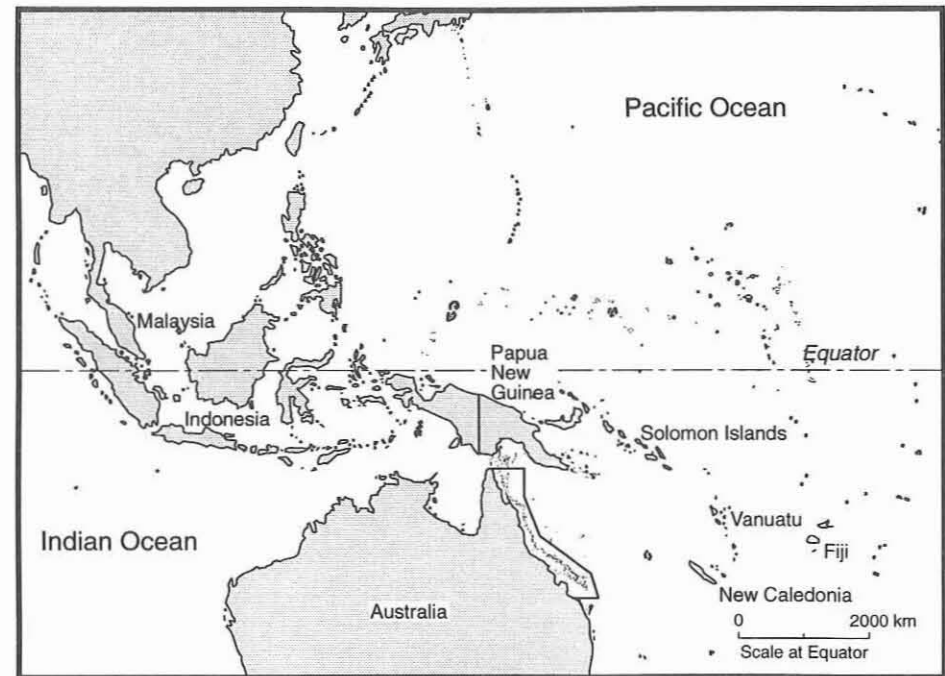
The IUCN and Australian listings reflect the fact that while many species are threatened on a worldwide scale, Australia tends to have a large proportion of the remaining populations. The sensitive ecological status of these animals globally highlights the need for effective management strategies to protect and conserve the Australian populations.

Traditional hunting

Green turtles and dugongs play an important role in the traditions and culture of Aboriginals and Torres Strait Islanders. These people have traditionally hunted them for thousands of years, although some groups exclude hunting of turtles or dugongs because of spiritual beliefs. Traditional hunting and consumption of the animals serve important economic, cultural and social functions. The Great Barrier Reef Marine Park Authority considers that traditional hunting alone does not necessarily endanger the species and would encourage traditional practices to continue, while the species remain ecologically secure.

Commercial exploitation

Turtles and dugongs in the Great Barrier Reef Region are now protected against commercial take. A history of commercial exploitation in the Region and continuing exploitation of some species outside the Region, may have contributed to a decline in



Map 2: Great Barrier Reef Region in context of the Indo-Pacific Region

turtle and dugong populations along the east coast of Australia. These populations were exploited for commercial purposes from the late nineteenth century to the 1960s, when both animals became protected under Commonwealth and Queensland law. Under these laws, hunting for non-commercial purposes by Aboriginals and Torres Strait Islanders is permissible.

The only species of turtle that has been clearly defined to have suffered a major population decline is the loggerhead, which is not and has not been, commercially exploited. This suggests that there are clearly more factors impacting on turtle and dugong populations than either traditional hunting or commercial exploitation.

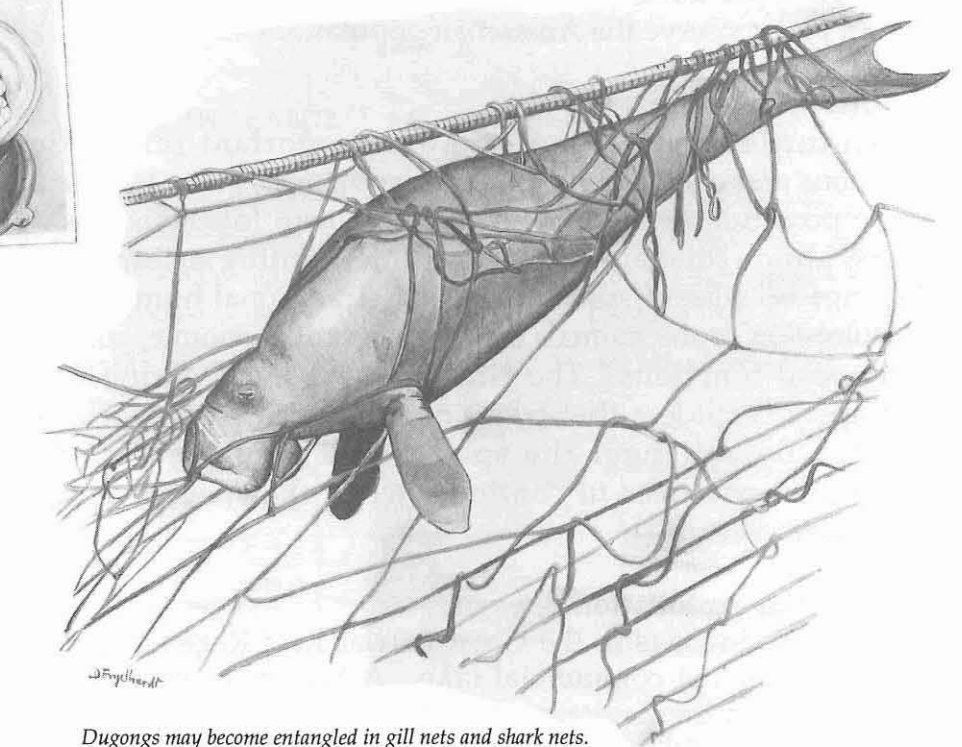
IMPACTS ON TURTLES AND DUGONGS

Present day turtle and dugong populations face numerous impacts that contribute to a decline in numbers. The seriousness of these impacts needs to be understood for the continued existence of turtles and dugongs. Factors identified as currently posing a real or potential risk to populations include (in no particular order):

- commercial gill netting
- boat traffic
- pollution
- coastal development
- international over-exploitation
- traditional hunting
- shark netting operations
- habitat degradation
- commercial trawling
- illegal take
- disturbance of nesting sites
- terrestrial practices and run-off
- natural impacts including tropical cyclones, floods, storms and predators.



Examples of turtle products exploited in overseas marketplaces.



Dugongs may become entangled in gill nets and shark nets.



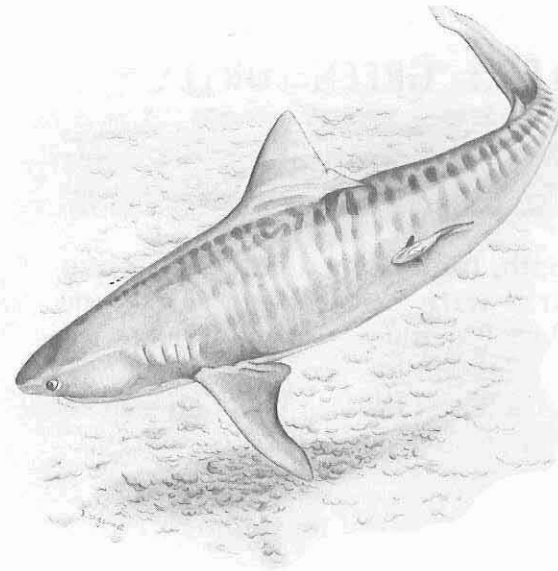
Motorised boat traffic may have detrimental effects due to boat strike and noise disturbance.



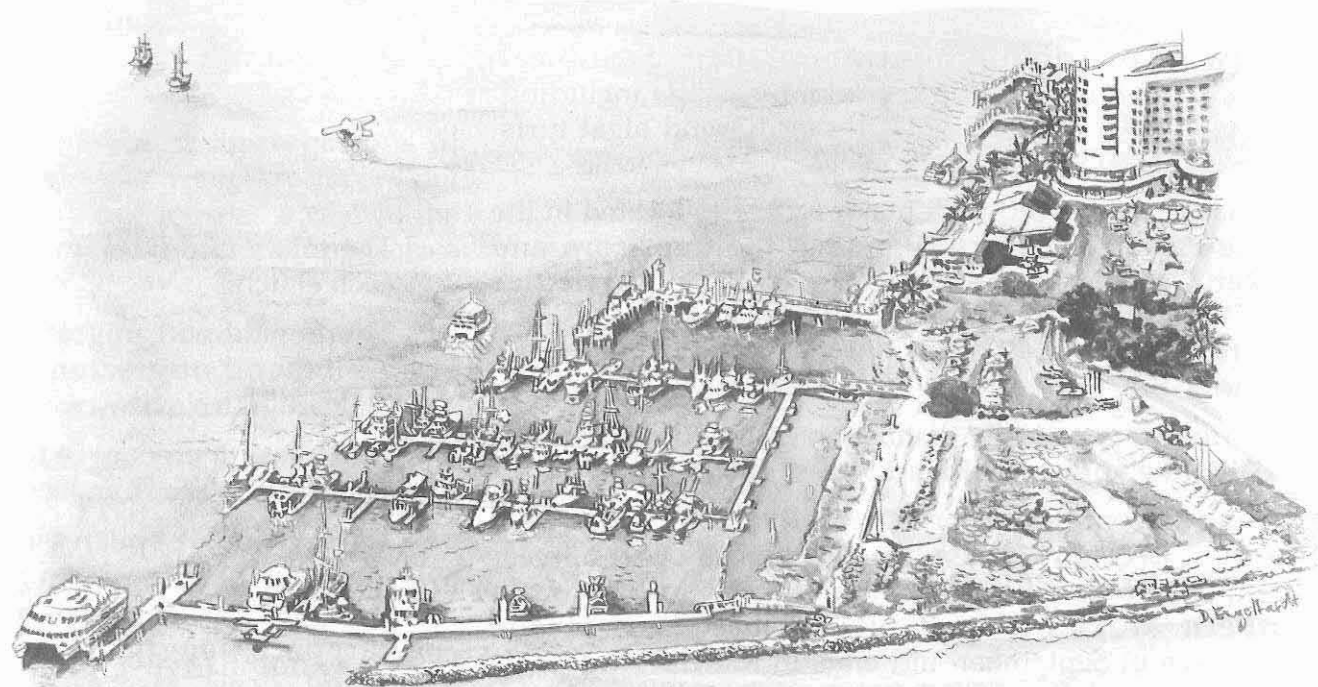
VALUES FOR CONSERVATION

Conservation of turtle and dugong populations:

- promotes international agreement to arrest declines in biodiversity;
- is a significant contribution to conserving the overall character, cultural and environmental integrity of the Great Barrier Reef World Heritage Area, of which turtle and dugongs are integral elements;
- assists the continuation of unique traditional cultures; and
- maintains future options for humanity to continue to appreciate the species.



The tiger shark, Galeocerdo cuvieri, is one of several natural predators of turtles and dugongs.

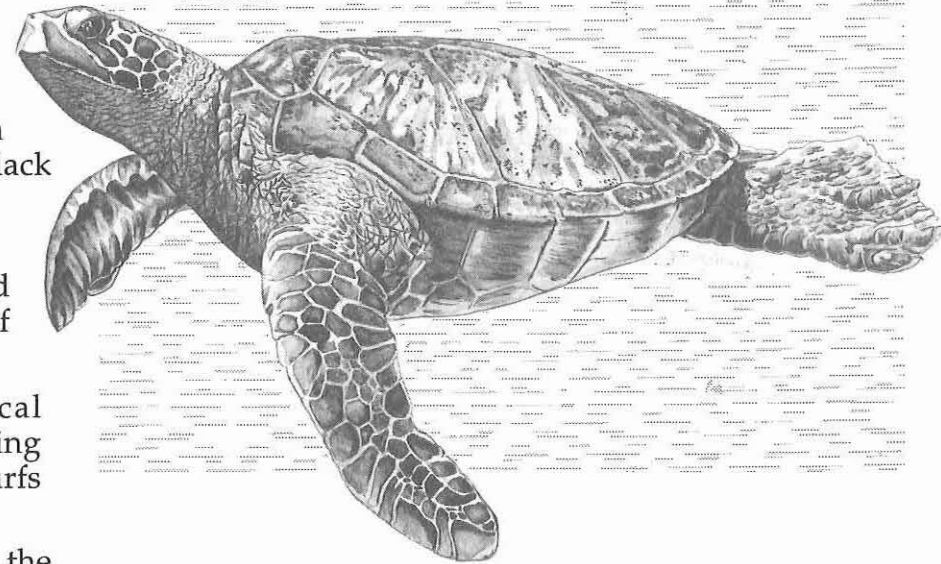


Coastal development can impact on turtle and dugong populations by altering their natural habitats and may have wider effects through increased traffic, nutrient run-off and pollution.

BIOLOGICAL NOTES : GREEN TURTLE

• Class: Reptilia • Order: Testudines • Family: Cheloniidae • Species: *Chelonia mydas*

- Adults have a smooth, high-domed carapace, olive green in colour, with occasional brown, reddish-brown or black highlights. The ventral surface is whitish-cream. Males are often darker and have a lower domed carapace than females. Hatchlings are black dorsally with white margins around the carapace and flippers, and white ventrally.
- Greens are large turtles, having an average curved carapace length of 107 cm and average weight of 130 kg.
- Worldwide distribution in tropical and subtropical waters, inhabiting tidal and subtidal habitats including coral and rocky reefs, seagrass meadows and algal turfs on sand and mud flats.
- Abundant on the GBR, with major rookeries located in the Marine Park. These are islands of the Capricorn and Bunker Groups in the southern GBR (in particular North West, Wreck and Hoskyn Islands); and Raine Island, Moulter Cay, No 7 and No 8 Sandbanks in the northern GBR.
- There are two genetically distinct breeding populations on the GBR - the northern GBR and the southern GBR.
- Breeding season: In the northern GBR mating occurs from August to December and while nesting can occur all year round, it is most prevalent from October to March. In southern areas of the GBR the breeding season commences in September and ends in March. The female will lay around five clutches in a nesting season with greater than 100 eggs per clutch.



There is a two-week interval between the laying of each clutch.

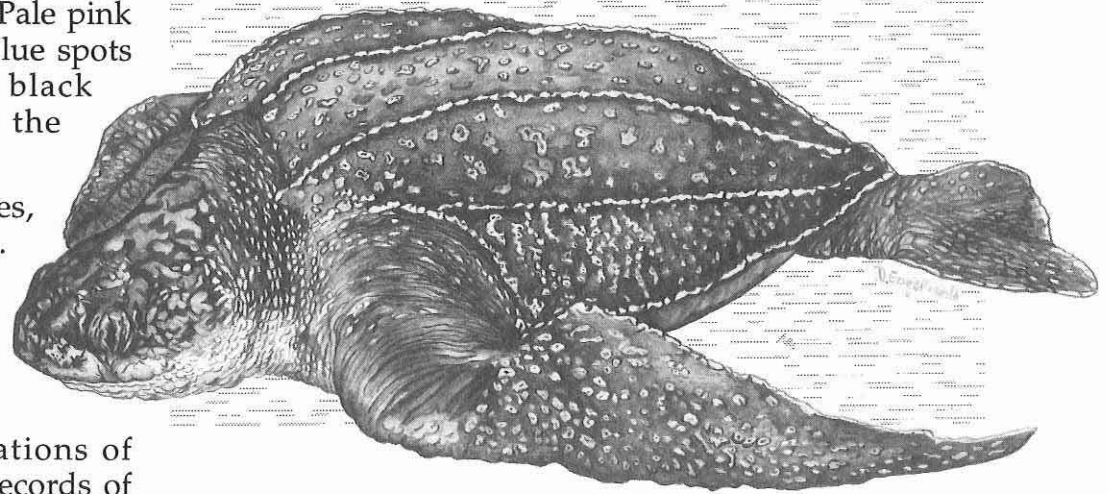
- The female will migrate to the breeding site after an interval of greater than five years, while the male migrates every two years.
- Hatchling emergence in the northern and southern GBR takes place from December to May.
- As with most species of marine turtles, greens may take between 30 to 50 years to reach maturity. At maturity, females have an average curved carapace length of 107.6 cm, and range of 91 to 124 cm.
- Herbivorous, feeding principally on seagrasses, algae and mangrove fruits.



LEATHERBACK TURTLE

• Class: Reptilia • Order: Testudines • Family: Dermochelyidae • Species: *Dermochelys coriacea*

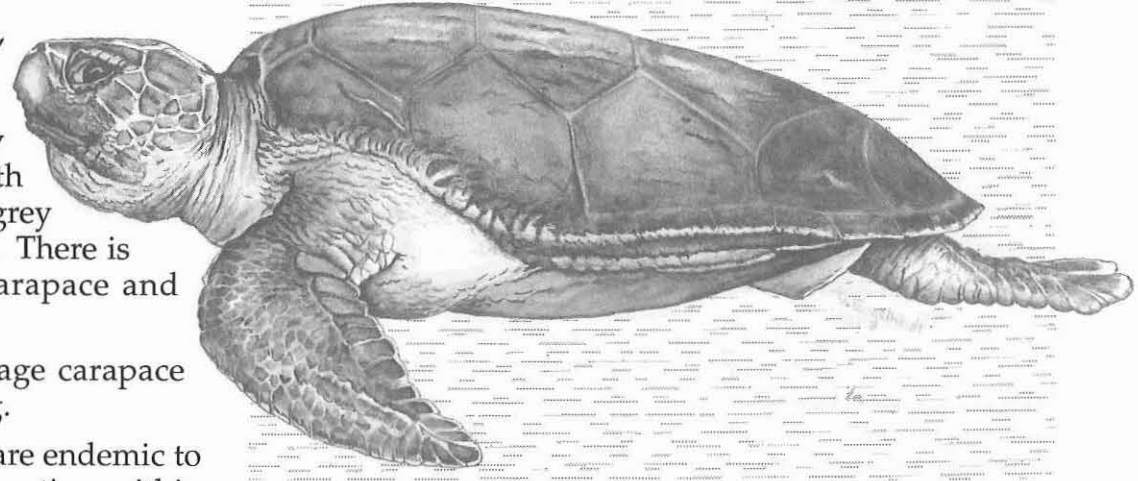
- Adults have a black carapace with five distinct longitudinal ridges and very pointed posterior. Pale pink spots are present on top of the head and pale blue spots may occur on the carapace. Hatchlings are black dorsally and ventrally with seven ridges on the carapace.
- Leatherbacks are the largest of the marine turtles, with an average carapace length of 162 cm. Adults may weigh up to a tonne.
- Distributed worldwide, throughout tropical and temperate oceans, in deep, open water habitats.
- There have been no major breeding aggregations of leatherbacks recorded in Australia. There are records of low density nesting, by one to three females a year in the GBRR, at Wreck Rock and on coastal beaches at Mackay, Round Hill and Bundaberg.
- Nesting commences in the GBRR around December and finishes in February. The eggs incubate around eight to nine weeks before the hatchlings emerge.
- The female lays up to four clutches in a breeding season, with around nine days between each nesting activity. There are an average of 86 eggs laid in each clutch.
- Females have an average curved carapace length of 162.4 cm at maturity, with a range of 150.5 to 174.5 cm.
- Carnivorous, feeding largely on jellyfish, tunicates and other soft bodied invertebrates. They feed at all levels of the water column from the benthos to the surface.



FLATBACK TURTLE

• Class: Reptilia • Order: Testudines • Family: Cheloniidae • Species: *Natator depressus*

- Adults have olive grey flippers and head, although the anterior of the head is yellow and the carapace is a darker olive grey. The ventral surface is cream in colour. They have a distinctive, low domed carapace with upturned lateral edges. Hatchlings have a grey dorsal surface with scales outlined in black. There is a white outline around the edge of the carapace and flippers, and white ventral surface.
- Medium to large adult turtle with an average carapace length of 92 cm and average weight of 82 kg.
- Flatbacks are of special significance as they are endemic to Australia. They have only been recorded nesting within continental shelf waters.
- The species is distributed throughout tropical and subtropical waters of northern Australia. They are abundant in Queensland waters, where they inhabit shallow coastal waters and inter-reefal soft bottom habitats, feeding in shallow turbid waters.
- Nesting principally occurs on the beaches of inshore continental islands and the mainland between Gladstone and Mackay. Major rookeries in the Marine Park are located at Peak, Wild Duck and Avoid Islands, in the southern and central regions of the GBR. Low density nesting also takes place on mainland beaches between Bundaberg and Cairns.
- The breeding strategy adopted by this species is very different to greens. Green turtles lay several large



clutches in a single breeding season, being active for a limited number of seasons. Flatbacks nest over a greater number of seasons, however each season is much shorter, and the female only lays a few, small clutches.

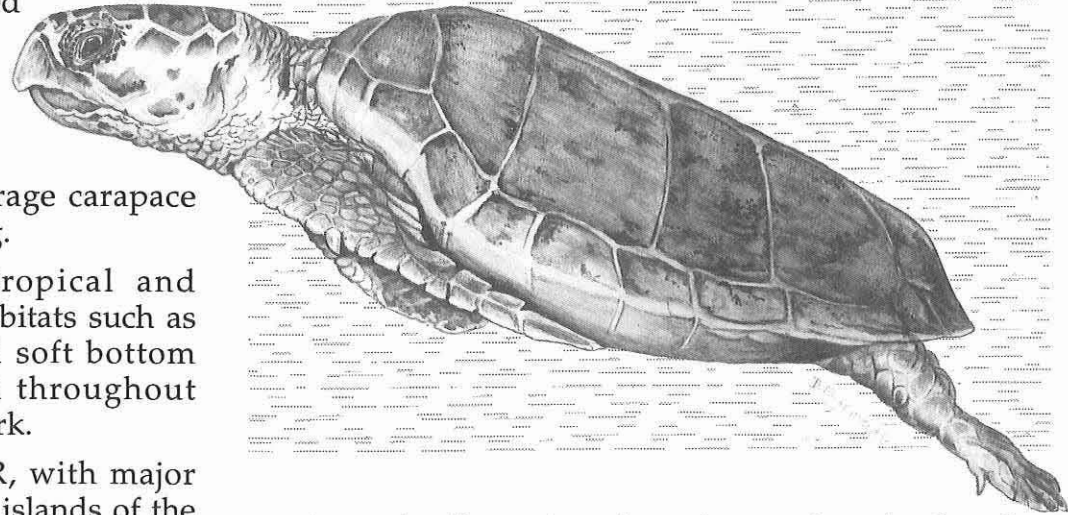
- The breeding season extends from October to January. Females come ashore around two to three times during a season to lay their clutches, averaging 50 eggs in each clutch. The interval between nesting is about 16 days. Females migrate to the breeding site every one to three years.
- At maturity, females have an average curved carapace length of 92.3 cm, and a range of 88 to 96 cm.
- Omnivorous, feeding on a variety of crustaceans, molluscs, jellyfish and algae.



LOGGERHEAD TURTLE

• Class: Reptilia • Order: Testudines • Family: Cheloniidae • Species: *Caretta caretta*

- Adults are brown dorsally often highlighted with light brown, reddish-brown and black, while the ventral surface is yellow. Hatchlings are dark brown dorsally and lighter brown ventrally.
- Loggerheads are large turtles with an average carapace length of 95 cm and average weight of 100 kg.
- Worldwide distribution throughout tropical and subtropical oceans, occurring in subtidal habitats such as coral and rocky reefs, seagrass beds and soft bottom habitats of mud and sand. Widespread throughout Queensland waters, including the Marine Park.
- There are two nesting stocks in the GBRR, with major rookeries in the Marine Park located on the islands of the Capricorn and Bunker Groups, especially Wreck, Tryon and Erskine Islands, and the cays of the Swain Reef. Nesting in the Region also occurs on the mainland coast from Bundaberg to Round Hill, in particular at Mon Repos and Wreck Rock beaches.
- Breeding season: Mating commences in October and extends to December. Nesting takes place from October to March. Hatchlings emerge from December through to April.
- The female lays an average of 125 eggs in a clutch, laying around three clutches during the nesting season. On average, there is a 14-day interval between clutches. Loggerheads migrate to their chosen breeding site every three to four years.

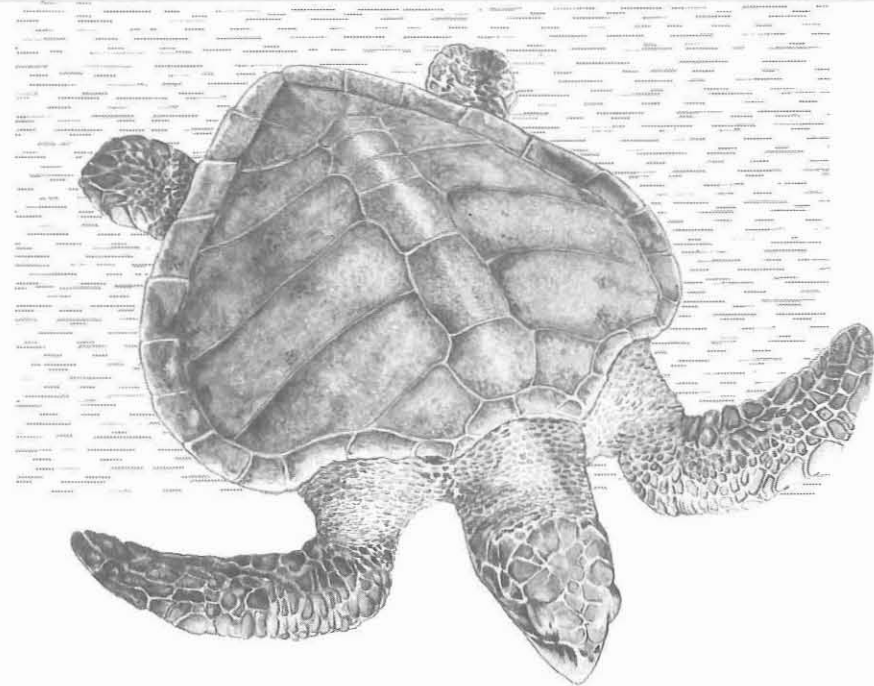


- As with all species of marine turtles, the females show a strong faithfulness to their chosen nesting site, returning to the same beach for each clutch and on successive nesting seasons. A high level of fidelity is also displayed towards their feeding ground.
- Females reach maturity at an average curved carapace length of 95.8 cm, with a range of 80 to 113.5 cm. Males have an average curved carapace length of 96.6 cm at maturity, and a range of 88 to 113 cm.
- Carnivorous, largely feeding on molluscs and crabs although occasionally feeding on other animals such as jellyfish, holothurians, sea urchins and fish.

OLIVE RIDLEY TURTLE

• Class: Reptilia • Order: Testudines • Family: Cheloniidae • Species: *Lepidochelys olivacea*

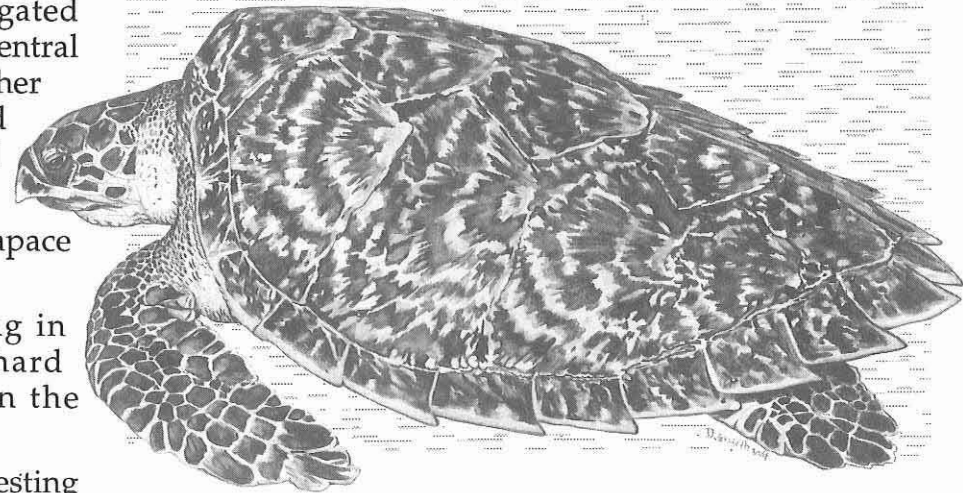
- Adults are a uniform grey to olive grey in colour on the dorsal surface, and whitish ventrally. The carapace is similar in appearance to a heart shape. Hatchlings are black brown on their dorsal and ventral surfaces.
- Smallest marine turtle in the Indo-West Pacific region, with adults having an average carapace length of 71 cm and average weight of 37 kg.
- Widespread distribution throughout the world's tropical and subtropical oceans, including northern Australia. They inhabit inter-reefal, soft bottom habitats. The species has not been recorded in coral reef, or coastal seagrass habitats.
- Feeding populations are present in the Marine Park, however no major breeding populations have been recorded on the east coast of Australia.
- Studies from Northern Territory breeding sites have indicated that nesting occurs all year round, although a peak in activity is evident in the cooler, dry season months. Females lay around 100 eggs per clutch, which incubate for approximately two months before the hatchlings emerge. There is no available information on the number of clutches per season, or how frequently the female returns to her chosen breeding site, for Australian olive ridley populations.
- At maturity, females have an average curved carapace length of 71 cm.
- Carnivorous, principally feeding on gastropod molluscs and small crabs.



HAWKSBILL TURTLE

• Class: Reptilia • Order: Testudines • Family: Cheloniidae • Species: *Eretmochelys imbricata*

- Adults have brown colouration, extensively variegated with brown and black on the dorsal surface. The ventral surface is cream with occasional black spots. Another distinguishing feature is a beak-like mouth and narrow head. Hatchlings have a dark brown dorsal surface and light brown ventral surface.
- Small to medium sized turtles with an average carapace length of 83 cm and average weight of 51 kg.
- Distributed worldwide in tropical oceans, living in association with coral reef systems and other hard substrate habitats. This species is prevalent in the northern GBR.
- Hawksbills are the most tropical of marine turtles, nesting only at the extreme north of the GBR. Nesting occurs all year round although a peak is evident from January to April. Recorded nesting on the GBR is largely on the inner shelf cays and islands, north of Princess Charlotte Bay. A major rookery is located at Milman Island.
- Females nest from two to four times in a breeding season, laying up to 150 eggs in a clutch. There is an interval of 15 to 20 days between nesting activity. The eggs incubate for a period of 50 to 70 days, depending on the temperature. While it is not yet certain, it is believed that the migration interval back to the breeding site is two to six years, or possibly more.



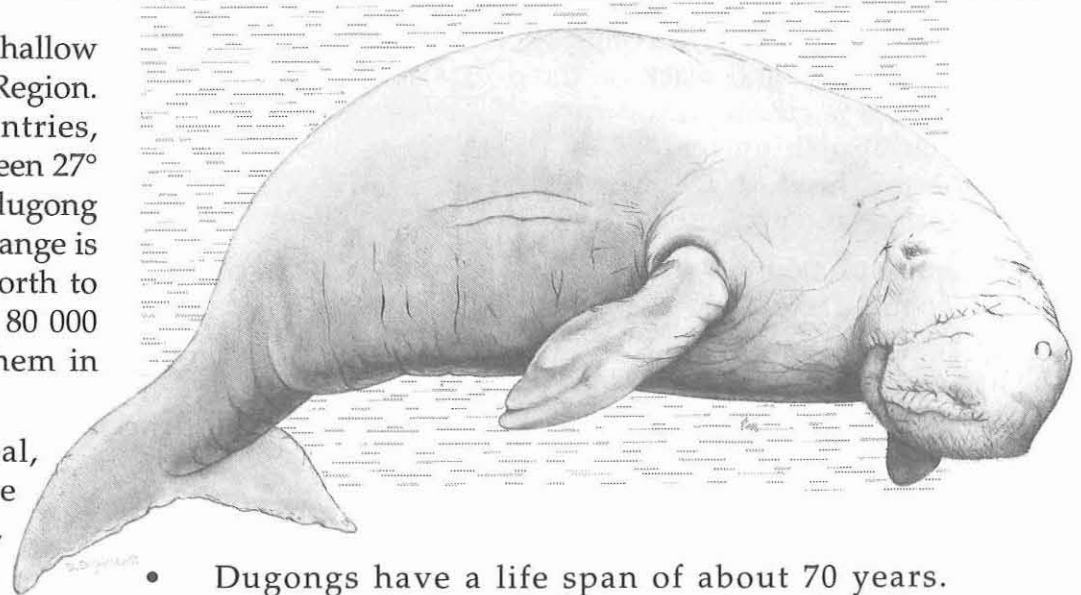
- The most serious problem affecting the long-term viability of hawksbill populations is the tortoiseshell (Bekko) trade.
- At maturity, females have an average curved carapace length of 83.2 cm, with a range of 75.5 to 92.5 cm.
- Omnivorous species, eating molluscs, crustaceans, sponges, soft corals and marine algae.



DUGONG

• Class: Mammalia • Order: Sirenia • Family: Dugongidae • Species: *Dugong dugon*

- Dugongs have a wide geographical distribution in shallow tropical and subtropical waters of the Indo-Pacific Region. Their range includes waters of 43 different countries, extending from eastern Africa to Vanuatu and between 27° north and south of the equator. However, many dugong populations are relict or extinct. In Australia, their range is from Shark Bay in Western Australia, across the north to Moreton Bay, Queensland. There are an estimated 80 000 dugong in Australian waters, about 12 000 of them in GBRMP waters.
- Dugongs look similar to a rotund dolphin or seal, although they are less streamlined. They have short flippers and their tail flukes are broad, similar to those of whales. Their head can look more like that of a pig, with a large, downward-pointing mouth. The body has a grey-bronze colouration, which is darker on the dorsal surface, than the ventral.
- Adult dugongs can grow to lengths greater than 3 m and weigh in excess of 400 kg.
- Despite their appearance, dugongs and their relatives (manatees and the now-extinct Steller's sea cow) are more closely related to elephants than to other marine mammals.



- Dugongs have a life span of about 70 years. Females, which are called cows, have their first calf between 9 and 17 years. Calves are born singly, with an interval of 3 to 7 years between each calf being born. The gestation period is 13 months, and calves suckle for 18 months. During this time there is a strong bond between the cow and calf.
- Most calves are born in the months from September to November, and reports indicate that calving occurs in specialised areas. These are often in shallow waters, removed from seagrass beds.
- Dugongs are the only strictly marine herbivores, feeding almost exclusively on seagrasses.



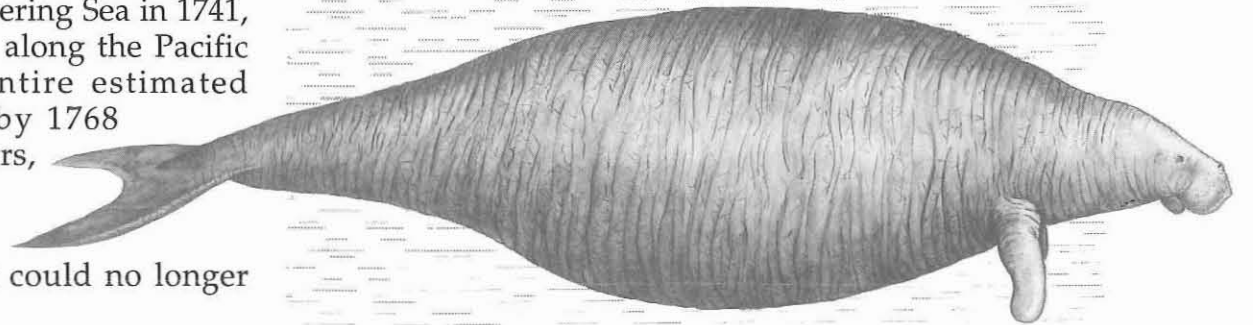
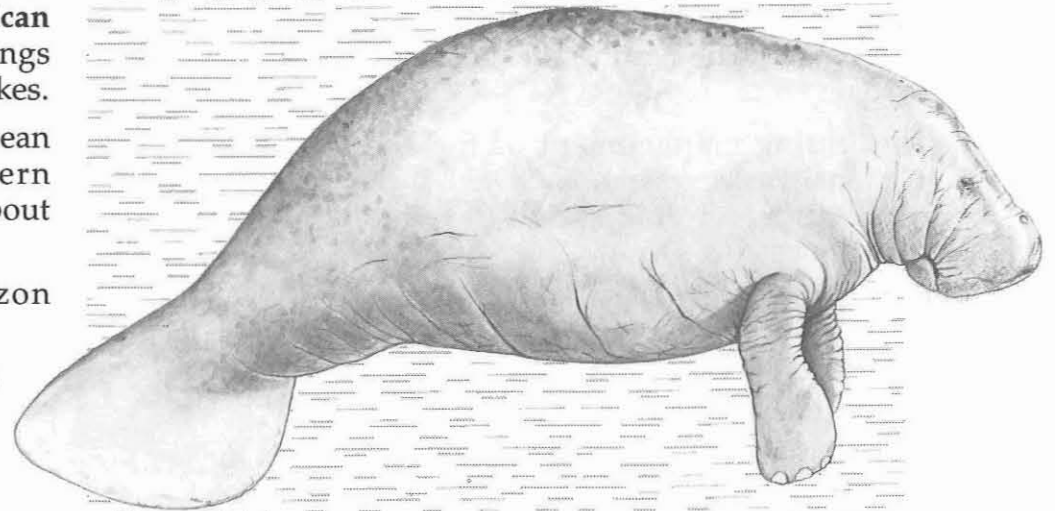
OTHER RELATIVES:

MANATEE

- There are three species of manatee: the **West Indian manatee**, the **Amazonian manatee** and the **West African manatee**. Manatees are less streamlined than dugongs and have a rounded, paddle-shaped tail rather than flukes.
- The range of the West Indian manatee is in the Caribbean region, from southern United States to the eastern extremity of South America. This species grows to about 3.8 m and weighs about 1600 kg.
- The Amazonian manatee inhabits the Amazon basin and has not been known to enter marine waters.
- The West African manatee lives in the rivers and coastal waters of West Africa.

STELLER'S SEA COW

- The Steller's sea cow was the closest relative to the dugong and grew to 8 m long and weighed more than 6000 kg.
- The last populations were found in the Bering Sea in 1741, but previous populations had occurred along the Pacific rim from Mexico to Japan. The entire estimated population of 2000 became extinct by 1768 due to intensive hunting by seal hunters, taking them for their meat.
- The species fed on kelp and became so well adapted to shallow waters that it could no longer dive, making it easy prey for hunters.
- The Steller's sea cow was the first marine mammal recorded as becoming extinct, in recent times.



RESEARCH AND MANAGEMENT

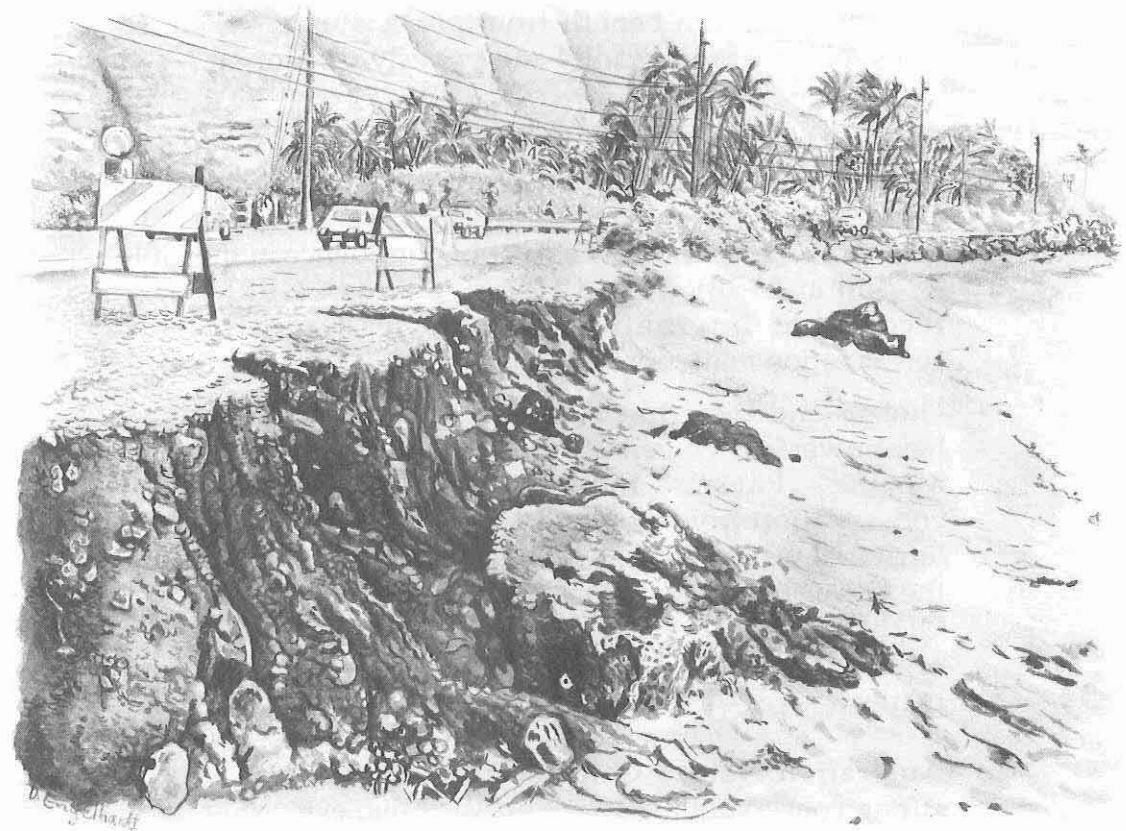
This Strategy has been developed against a background of substantial prior work by a range of agencies and groups, including:

- identification and protection, by QDEH, of many significant turtle nesting sites through the National Parks system;
- continuing management of the National and Island National Parks system by QDEH, including management of visitors and eradication of feral animals that may threaten nesting sites;
- extensive research concerning turtle exclusion devices by Queensland Department of Primary Industries (QDPI), QDEH and Queensland Commercial Fishermen's Organisation (QCFO);
- development of environmental standards by QCFO for use by their members;
- extensive long-term research programs into the population dynamics and biology of turtles and dugongs by, or through funding from, the Australian Nature Conservation Agency (ANCA), QDEH, GBRMPA and other agencies;
- long-term research into trawling and turtles, which may indicate mortality and population trends, by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and QDPI;
- development and management of Marine Parks, including protective zoning of key breeding and feeding sites and/or adjacent habitats by QDEH and GBRMPA;
- establishment of fisheries reserves for seagrass conservation by QDPI;
- monitoring of shark meshing programs and trend toward net replacement by drumlines, by QDPI and Queensland Boating and Fisheries Patrol (QB&FP);
- bans on take of turtles and dugongs except by Aboriginals and Torres Strait Islanders for traditional purposes;
- development by GBRMPA and QDEH, of cooperative management arrangements with Aboriginal and Torres Strait Islander groups to assist in managing the take of turtles and dugongs for traditional purposes;
- research and monitoring of the characteristics, functions, distribution and abundance of seagrass meadows by QDPI;
- monitoring by QDEH staff of seagrass meadows in the GBR Region;
- implementation of protective legislation by ANCA, QDEH, QDPI and GBRMPA;
- extensive research and monitoring by James Cook University of North Queensland (JCUNQ) and other tertiary institutions relating to the biology, distribution and abundance of dugong and turtle populations in the GBRMP.



Turtles and dugongs are long-lived animals with complex reproductive characteristics. All species are mobile and may travel great distances during their lives. Consequently, they may be exposed to a number of impacts that could, individually or cumulatively, endanger them. Research on turtle and dugong populations is generally difficult, costly and often long-term in nature.

These biological characteristics also mean that the causal factors operating on turtles and dugongs as individuals, populations or as a species may continue to have an impact even after management action is taken. This lead time means that a coordinated, long-term and well-resourced research effort is required. However, management action cannot necessarily wait for conclusive and irrefutable proof that an impact exists and is jeopardising the viability of a species. Balancing conflicting demands between the needs of the species, demands of the proponents of activities that may threaten the species and inadequate, but growing research information will be a major challenge to implementing this strategy. Central to the success of the strategy is cooperation from all interests combined with the common goal of conservation of the species.



Environmentally inappropriate development can cause foreshore degradation that disturbs or destroys nesting sites and increases run-off into the ocean.



JURISDICTIONS

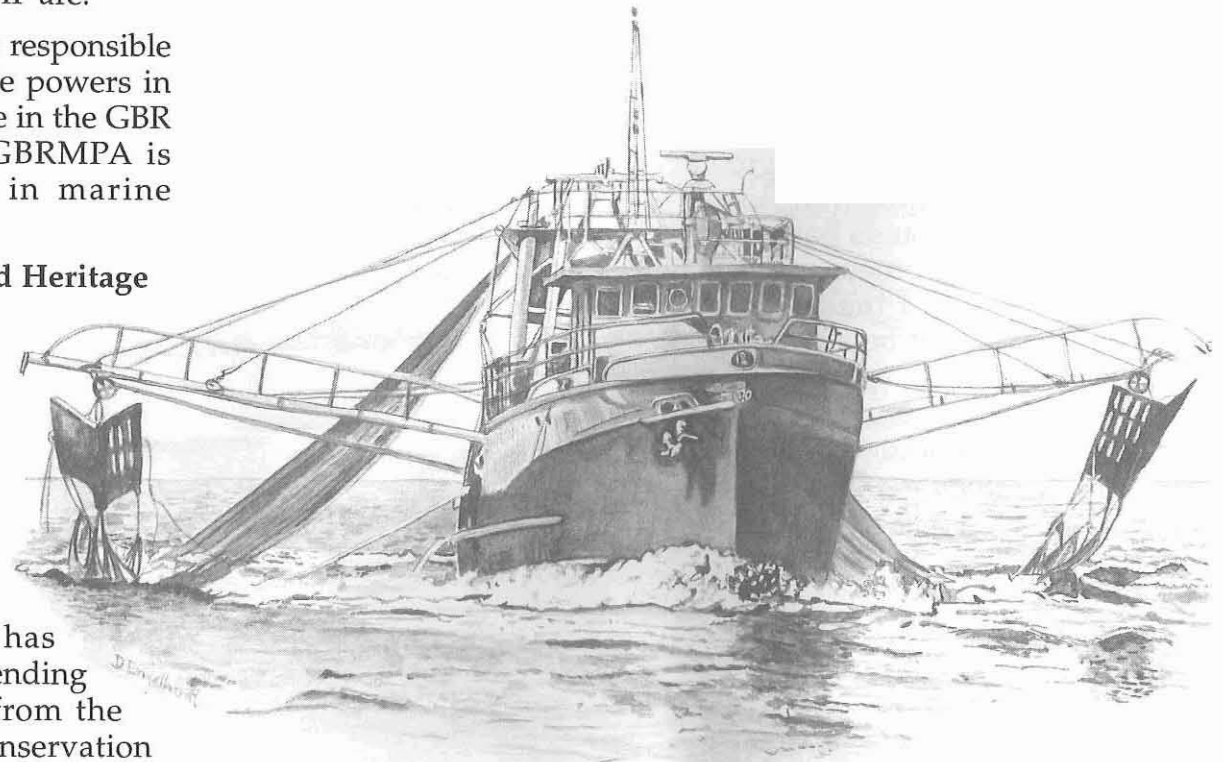
Many agencies and organisations are involved in matters related to turtle and dugong conservation. Among various agencies there are often overlapping areas of jurisdiction, either geographically, legislatively or in terms of tasks undertaken.

Part of the reason for developing this strategy is to encourage key interests, governmental or otherwise, to focus on agreed issues to gain maximum benefit from projects undertaken, so that various roles are more readily and publicly recognised.

The main agency responsibilities related to the GBRMP are:

- **Great Barrier Reef Marine Park Authority** is responsible for management of the GBRMP and has wide powers in the area. The Authority has a strong influence in the GBR Region and GBR World Heritage Area. GBRMPA is recognised internationally as a leader in marine conservation matters.
- **Queensland Department of Environment and Heritage** has powers in Queensland National and Marine Parks, including strong conservation powers within Queensland territorial waters (within 3 nautical miles of the Queensland coastline as legally defined). QDEH is influential nationally and regionally with regards to conservation matters.
- **Australian Nature Conservation Agency** has strong conservation powers in Australia, extending to seas between 3 and 200 nautical miles from the coastline. ANCA is influential regarding conservation matters in Australia and internationally.

- **Queensland Department of Primary Industries**, including the **Queensland Boating and Fisheries Patrol**, has enforcement and management powers that extend throughout Queensland, including State marine waters. Commonwealth powers out to 200 nautical miles have been delegated to QDPI/QB&FP, in some matters. The **Queensland Fish Management Authority** exercises the day-to-day management of fisheries in Queensland.



The commercial trawling industry has some incidental by-catch of marine turtles.

GBRMPA has clear jurisdictional powers in the GBRMP that are best complemented by agreed actions in adjacent Queensland waters and lands and beyond the Marine Park, to 200 nautical miles. Ideally, what occurs in the GBRMP should be one of a series of actions in Queensland, Australian and international waters to conserve turtles and dugongs.

This strategy seeks to:

- encourage action in the GBRMP, that will in turn promote wider action, to conserve turtles and dugongs;
- develop initiatives through the core programs of agencies and groups, rather than establishing special programs for turtles and dugongs. This is to consolidate work already undertaken, while continuing to encourage the principle that species conservation cannot be done in isolation to habitat protection and raising environmental awareness;
- establish a Turtle and Dugong Review Group to:
 - review and advise on conservation and management actions, both current and proposed;
 - represent the views of interested agencies and the community when reviewing actions;
 - advise agencies and other interested parties on technical matters, including research needs and priorities; and
 - devise and make recommendations about funding and administrative matters as required.

The proposed GBRMP Turtle and Dugong Review Group would be convened and chaired by GBRMPA staff, with representation invited from:

- ANCA
- QDEH
- QDPI
- QFMA
- QCFO
- Coastal development interests
- Conservation interests
- Aboriginal and Torres Strait Islander interests
- Research interests.

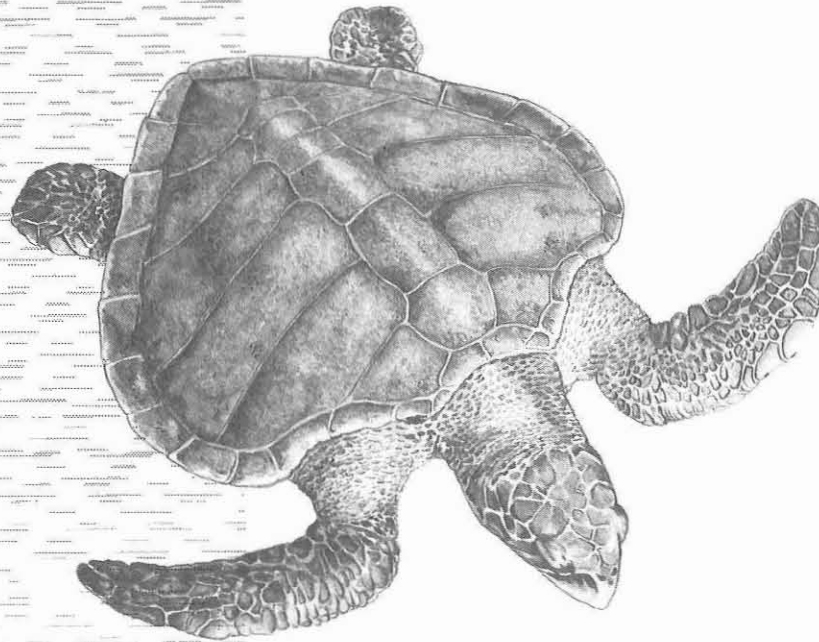


GOAL

To have conservation strategies that contribute to maintaining turtle and dugong populations at current or higher levels throughout their range in the Great Barrier Reef Region, whilst providing for their traditional, cultural use by Aboriginals and Torres Strait Islanders.

The strategies are to be implemented with consideration of the biological constraints of the species and through negotiation with scientists, Aboriginals and Torres Strait Islanders, conservation groups, the commercial fishing industry, management agencies and the general public.

The proposed strategies are outlined in the following tables.



STRATEGIES

Issue/Objective	Strategy	Mechanisms	Key Players	Timetable	Comments
1. Habitat Protection Identify and manage destructive human activities to protect crucial habitats for turtles and dugongs.	1.1 On the basis of scientific research and traditional knowledge, identify crucial turtle and dugong areas and their protection needs.	1. Marine Parks and coastal rezonings. 2. Marine Park planning and management.	GBRMPA, QDEH, QDPI, A&TSI and Researchers	Continuing	Identify and record suitable and most appropriate areas and means for sanctuary/protected area development.
	1.2 Continue to establish marine and coastal sanctuaries/protected areas for crucial turtle and dugong areas, including feeding, breeding, nesting, calving and nursery areas.	Core GBRMPA and QDEH planning programs.	GBRMPA, QDEH, QDPI, A&TSI and QFMA	Continuing	Continuing, as coastal and Marine Park planning progresses and is reviewed. Complementary State and Commonwealth actions.
	1.3 Review and develop the means to ensure that the appropriate protection is provided for crucial habitat areas, including zoning or legislative change, if necessary.	Turtle and Dugong Review Group.	GBRMPA, QDEH, QDPI, A&TSI and QFMA	1994 and onwards	State and Commonwealth agencies to amend their legislation to provide appropriate protection for the species, if required.
	1.4 Encourage improved coastal zone and catchment area management, through the conduct of an awareness campaign with local government authorities.	Core GBRMPA, QDEH and QDPI programs.	GBRMPA, QDEH, A&TSI and Local Government	1994 and onwards	To be implemented through core planning and management programs.
	1.5 Identify and publicise areas to be avoided by dredges and areas unsuitable for the dumping of dredge spoil.	GBRMPA and QDEH permits, and public relations.	GBRMPA, QDEH and QDoT	1995	Identify by 1995. Immediate effect through permits.
	1.6 Continue to identify and publicise areas to be avoided by commercial fishing operations and/or where fishers must operate with management constraints, such as turtle exclusion devices, length of shot time and net dimensions.	Codes of practice, regulations and zoning requirements if needed.	GBRMPA, QDEH, QDPI, QCFO and QFMA	Continuing	Identify areas, needs and foreshadow requirements via planning programs, formal requirements to follow as needed.
	1.7 Review the need for emergency provisions to protect areas suffering acute stress.	Turtle and Dugong Review Group.	GBRMPA, QDEH, QDPI, QCFO, QFMA, A&TSI and Researchers	1994	Emergency closure of areas, responsive to need. For incorporation in zoning if necessary.
	1.8 On the basis of scientific research and traditional knowledge, determine the efficacy of marine sanctuaries and seasonal closure areas for crucial habitats.	Turtle and Dugong Review Group.	GBRMPA, QDEH, QDPI, QFMA A&TSI and Researchers	1995 and onwards	Input through planning and management programs.



Issue/Objective	Strategy	Mechanisms	Key Players	Timetable	Comments
2. Commercial Fishing: Trawling and Gill Netting Continue to change fishing practices (trawling and gill netting) to minimise the level of accidental capture and death resulting from the incidental capture of turtles and dugongs.	2.1 Continue to develop and promote guidelines for "best practice" in the commercial fishing industry and recreational fishing e.g. the frequency of net checks, specified net dimensions, length of shot time and the removal and recovery of animals from nets.	Liaison, public relations and regulation, if necessary.	GBRMPA, QDEH, QDPI, QFMA and QCFO	Continuing	Voluntary compliance is strongly preferred as effective enforcement is difficult.
	2.2 Develop and promote the use of guidelines for turtle recovery post-trawl.	Liaison and public relations programs.	GBRMPA, QDEH, QDPI, QFMA and QCFO	Continuing	Voluntary compliance is essential. QCFO has information from international sources.
	2.3 Legislate requirements if compliance with guidelines is inadequate within 18 months of introduction.	GBRMPA and Queensland legislation.	GBRMPA, QDEH, QFMA and QDPI	Review in 1996	Monitoring for voluntary compliance is required.
	2.4 Develop and conduct an awareness campaign for the commercial fishing industry, including information about crucial habitat areas, species biology and traditional knowledge from A&TSI, fishing industry and other sources.	Mass media, videos and public meetings.	GBRMPA, QDEH, QDPI, QFMA, QCFO and A&TSI	1995	Negotiate with QCFO, QDPI, QFMA and QDEH to fund and develop the campaign. Means of positive publicity. To include recreational fishing interests where applicable.
	2.5 Provide the commercial fishing industry with maps indicating high sensitivity areas and advise on the avoidance of these areas.	Public relations, liaison, public meetings, zoning and voluntary compliance.	GBRMPA, QDEH, QFMA and QCFO	1995	Part of the coastal and Marine Park planning programs.
	2.6 Facilitate liaison between Aboriginal and Torres Strait Islander groups and the commercial fishing industry to promote understanding of viewpoints and encouraging collaboration in practices to protect turtles and dugongs.	Mass media, public relations, liaison, public meetings and videos.	GBRMPA, QDEH, A&TSI, QFMA and QCFO	Continuing	Commenced in 1993, to continue as a component of GBRMPA/ QDEH planning programs.
	2.7 Continue to conduct research on the effects of trawling and turtle exclusion devices for trawl nets.	Current research programs.	QDPI and CSIRO	Continuing	Research currently being conducted by QDPI and CSIRO.

Issue/Objective	Strategy	Mechanisms	Key Players	Timetable	Comments
3. Aboriginal and Torres Strait Islander Issues Establish cooperative management systems to locally manage use, conservation and preservation of turtles and dugongs and their habitats, whilst allowing for continuance of Aboriginal and Torres Strait Islander cultures.	3.1 Develop community involvement in the management of marine resources through cooperative management arrangements.	Liaison and public relations.	GBRMPA, QDEH, ANCA and A&TSI	Continuing	Input via several GBRMPA, ANCA and QDEH programs.
	3.2 Continue with the development of Community Ranger involvement in marine issues.	Liaison, training, funding and monitoring.	GBRMPA, QDEH, ANCA and A&TSI	Continuing	ANCA funding, continuing development in 1993/94.
	3.3 Integration of Aboriginal and Torres Strait Islander involvement in scientific research.	Public relations, liaison and codes of practice.	GBRMPA, QDEH, A&TSI, QDPI and Researchers	1995	GBRMPA to develop the mechanisms.
	3.4 Develop guidelines for researchers working with Aboriginal and Torres Strait Islander communities.	Guidelines and codes of practice.	GBRMPA, QDEH, A&TSI and Researchers	1995	High researcher and A&TSI involvement is essential.
	3.5 Encourage the establishment of a council to facilitate communication and understanding between managers, scientists and Aborigines and Torres Strait Islanders.	Liaison and consultation.	GBRMPA, QDEH, A&TSI and Researchers	1995	The purpose is to encourage the use of a code of ethics and resolve any disputes that may arise.
	3.6 Develop and enforce traditional hunting guidelines in conjunction with Aboriginal and Torres Strait Islander groups and researchers.	Liaison systems, consultation and documentation.	GBRMPA, QDEH, A&TSI and Researchers	Continuing	Component of the Council of Elders program. Require: i) consideration of traditional values; ii) public relations within and across cultures.
	3.7 Define sustainable harvest rates for traditional hunting in conjunction with Aboriginal and Torres Strait Islander groups and researchers.	Research, consultation and extension.	Turtle and Dugong Review Group	Continuing	Initial indications of the levels of harvest by the end of 1994. Refinement from them on.
	3.8 Identify and record Aboriginal and Torres Strait Islander hunting areas.	Research, liaison and consultation.	GBRMPA, QDEH and A&TSI	Continuing	Action through zoning, liaison and cooperative management.
	3.9 Continue to record the traditional knowledge and lore of Aboriginals and Torres Strait Islanders in coastal areas of the Marine Park, to the extent agreed by A&TSI groups.	Liaison, consultations and documentation.	GBRMPA, QDEH and A&TSI	Continuing	Incorporation of the data onto the GBRMPA GIS. Information to be adopted into planning programs and extension.
	3.10 Review the laws for the sale, trade and barter of these species.	Liaison.	GBRMPA, QDEH and A&TSI	1994	A&TSI input is essential. Sustainable harvest rates must be determined.



Issue/Objective	Strategy	Mechanisms	Key Players	Timetable	Comments
4. Incidental Injury and Kills Significantly reduce the levels of incidental turtle and dugong injury and kills by boats, accidental capture, pollution, and the loss of habitat as a consequence of catastrophic events.	4.1 Review the current shark meshing/beach protection program.	Turtle and Dugong Review Group.	GBRMPA, QDEH, QDPI, QB&FP and Researchers	Continuing	QB&FP/QDPI are undertaking changes in the beach protection program.
	4.2 Conduct a multi-agency awareness campaign for boat users about crucial turtle and dugong areas.	Public relations campaign linked with research and traditional knowledge.	GBRMPA, QDEH, QDPI, ANCA, A&TSI, QDoT and Researchers	1995	Possible funding from the OR2000 and/or corporate funds, for strategies 4.2 and 4.3.
	4.3 Develop, advertise and ensure compliance with guidelines for travelling in identified habitat areas.	Public relations campaign linked with research and traditional knowledge.	GBRMPA, QDEH, QDPI, ANCA, A&TSI, QDoT and Researchers	1995	Encouragement of voluntary compliance is essential. Introduction of "Go slow" zones, with possible incorporation in zoning if necessary.
	4.4 Develop recovery and contingency plans for species post-catastrophic events, both natural and unnatural e.g. cyclone, flood, oil spill.	Research, day-to-day management and volunteer groups.	GBRMPA, QDEH, QDPI, A&TSI and Researchers	1995	Short and long term responses are needed.
	4.5 Educate the public on the necessity to advise management agencies of any accidental kills of turtles and dugongs.	Public relations, '008' phone number.	GBRMPA, QDEH, QFMA and ANCA	1994	Funding is required. Possible corporate sponsorship.
	4.6 Collate information on the level of incidental mortality for turtles and dugongs.	Liaison, public relations and research.	QDEH, QDPI, QB&FP and QCFO	Continuing	Sources of incidental kills include shark meshing, netting, trawling, pollution, floatlines and boat strike.
5. Illegal Take By legal deterrents and community pressure, minimise illegal killing of turtles and dugongs.	5.1 Estimate levels of illegal take from all sectors of the community.	Liaison and defining the level of legal take.	GBRMPA, QDEH, QDPI, and A&TSI	1995	Through monitoring and enforcement programs. Also public education.
	5.2 Improve monitoring and enforcement programs within the Marine Park.	Liaison, training and monitoring.	GBRMPA, QDEH, QDPI, QB&FP and A&TSI	Continuing	GBRMPA lead agency. Explore local cooperative management and enforcement systems to assist enforcement.
	5.3 Review the existing Commonwealth and State legislation and penalties for illegal take, if necessary.	Review and assessment.	GBRMPA, ANCA, QDPI and QDEH	1996	Onus is on agencies to review their legislation.

Issue/Objective	Strategy	Mechanisms	Key Players	Timetable	Comments
6. Restoration Plans Develop and implement the means to restore degraded or threatened habitats and turtle and dugong populations.	6.1 Promote research to determine the causes of habitat degradation and species decline.	Turtle and Dugong Review Group.	Turtle and Dugong Review Group	Continuing	Determine broad and local level impacts affecting habitats and species.
	6.2 Conduct a status inventory of habitat areas, identifying areas requiring restoration to an ecologically secure condition.	Turtle and Dugong Review Group.	Turtle and Dugong Review Group	To be determined	Funding is required. Incorporate into current or proposed planning programs where possible.
	6.3 Conduct a status inventory of turtle and dugong populations, identifying stocks that require restoration to an ecologically secure condition.	Turtle and Dugong Review Group.	Turtle and Dugong Review Group	To be determined	Funding is required. Incorporate into current or proposed planning programs where possible.
	6.4 Define, prioritise and promote research on recovery actions for species and habitats, including cost benefit analyses.	Turtle and Dugong Review Group.	Turtle and Dugong Review Group	To be determined	Research may involve a review of seagrass reseeding/artificial recovery. Prioritise on the basis of costs and benefits.
7. State, National and International Issues A. Encourage a reduction in the killing of turtles and dugongs in South Pacific and Asian countries through representations to state, national and international committees. B. Encourage a commitment by state, national and international agencies to protect and conserve turtles and dugongs.	7.1 Monitor issues and developments in state, national and international committees for species protection.	To be addressed by the key players.	ANCA and QDEH	Continuing	GBRMPA would seek advice on developments from key players.
	7.2 Promote the development of recovery plans and conservation plans for turtles and dugongs using Great Barrier Reef Region as a test case.	To be addressed by the key players.	ANCA, QDEH and GBRMPA	1994	Ensure that GBRMP developments are reported to state and national committees.
	7.3 Ensure representation of GBRMPA's position on state, national and international committees.	Turtle and Dugong Review Group.	GBRMPA, ANCA and QDEH	Continuing	Indirect representation through agencies and/or the Turtle and Dugong Review Group.
	7.4 Encourage neighbouring nations to monitor and record catch statistics for turtles and dugongs.	To be addressed by the key players.	ANCA, SPREP and DFAT	To be determined	The adoption of ecologically sustainable catch rates by other nations of turtles and dugongs, is essential to GBR Region populations.
	7.5 Enlist the support and involvement of international conservation groups.	Turtle and Dugong Review Group.	IUCN Specialist Groups, WWF, Greenpeace	1994 and onwards	Request their assistance to stress management strategies and advise overseas countries on turtle and dugong conservation.



Issue/Objective	Strategy	Mechanisms	Key Players	Timetable	Comments
8. Research and Monitoring Promote research and monitoring for the protection of turtles, dugong and their habitats.	8.1 Identify and prioritise the research and monitoring needs of the turtle and dugong conservation strategy including the linking of scientific and traditional knowledge.	Turtle and Dugong Review Group.	Turtle and Dugong Review Group	1994	First major task for the Turtle and Dugong Review Group. Discuss and record needs with researchers, Aboriginals and Torres Strait Islanders. Forms the basis for funding of the strategy.
9. Climate of Understanding Establish a climate of understanding between management agencies and with the public as a whole, concerning the conservation needs of turtles and dugongs.	9.1 Maintain consistent communication between GBRMPA and other management agencies, with regards to turtle and dugong conservation.	Develop a commitment between agencies to liaise, consult and negotiate.	GBRMPA, QDEH, QDPI, QB&FP, A&TSI and ANCA	Continuing	Present levels of communication need to be further developed.
	9.2 Develop links and mechanisms for non-agency interests to contribute towards the turtle and dugong conservation strategy.	Develop a commitment between agencies and public interest to liaise, consult and negotiate.	GBRMPA, QDEH, ANCA, A&TSI and Researchers	1994 and onwards	Public awareness and capacity to contribute is essential to the success of the conservation strategy. Includes A&TSI, recreational, commercial fishing and conservation groups.
	9.3 Establish an awareness by the general public on the need for the conservation of turtles and dugongs, through the development of interactive education and information programs.	Education and Information programs: media, public displays and school programs.	GBRMPA, QDEH, QDPI, QB&FP, QCFO, ANCA, A&TSI, AMPPTO and Researchers	1994 and onwards	An effective method of management will be promoting the public's awareness of dugongs and turtles and their ecological status.