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Published July 1994 by the Great Barrier Reef Marine Park Authority PO Box 1379 TOWNSVILLE QLD 4810

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The National Library of Australia Cataloguing-in-Publication data:

Turtle and dugong conservation strategy for the Great Barrier Reef Marine Park.

ISBN 0 642 17419 9.

Dugong - Queensland - Great Barrier Reef Marine Park.
 Sea turtles - Queensland - Great Barrier Reef Marine Park.
 Rare mammals - Queensland. I. Ellis, Nicole, 1969- .
 II. Great Barrier Reef Marine Park Authority (Australia).

591.52909943

ACKNOWLEDGMENTS

The Great Barrier Reef Marine Park Authority gratefully acknowledges advice from a wide range of agencies, organisations and individuals in preparing this document. In particular, the Authority would like to acknowledge advice and information provided by Professor Helene Marsh (James Cook University of North Queensland), Dr Col Limpus and Dr Jeff Miller (Queensland Department of Environment and Heritage). Illustrations are by Doris Engelhardt of REEFWATCH - Marine Environmental Consultants.

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Traditional hunting of turtles and dugongs has been an import at cussion of Aboriginals and Torres Strait Islanders for how nouseds of years.

Abbreviations use	d in this document:		-*lo _{ft}
• 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	• QB&FP	Queensland Boating and Fisheries Patrol
	Conservation Council	 QCFO 	Queensland Commercial Fishermen's Organisation
 A&TSI 	Aboriginal and Torres Strait Islander	 QDEH 	Queensland Department of Environment and
 Conservationists 	Conservation groups, at both the national and		Heritage
	international scale	• QDPI	Queensland Department of Primary Industries
 CSIRO 	Commonwealth Scientif c and Incustrial Research	 QDoT 	Queensland Department of Transport
	Organisation	 QFMA 	Queensland Fish Management Authority
• DFAT	Department of Foreign Appirs and Trade	 Researchers 	Scientific community, whether or not they are
• GBR	Great Barrier Reef		employed by an agency
 GBRMP 	Great Barrier Reef Marine Park	 Scientific 	Biologists, ecologists, anthropologists, and
• GBRMPA	Great Barrier Reef Marine Park Authority	Community	geographers involved in research related to turtles
• GBRR	Great Barrier Reef Region		and dugongs
• GIS	Geographic Information System	 SPREP 	South Pacific Regional Environment Programme
• IUCN	International Union for the Conservation of Nature	 T&D Review Group 	Turtle and Dugong Review Group
	and Natural Resources	• WWF	World Wide Fund for Nature

Turtle and Dugong Conservation Strategy **Issues** Paper iii

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

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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 case and development of the Marine Park through the conduct of research, and the deliberate acquisition use and dissemination of relevant information nom 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 tark consistent with the goal and other aims of the authority.
- To commine 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.

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 Derrier Reef Region is only part of a much larger picture of ne essar conservation.

The Queensland Department of Environment and Heritare (ODEH) has cooperated and assisted with the preparation of the present Strategy. QDEH is correctly 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 *Endangeral Sprites Protection Act 1992* and in cooperation with other state and regional governments, is moving towards a set of many ement on asures that will be consistent across state and neighbologing 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 ag with the cooperation of the public. Effective management mus be cooperative across regional, state, national and international administrative boundaries.

Conservation status

Worldwide, the dugong is listed in the 1900 IUCL Red List of Threatened Animals as being *vulnerable* to extinction. The species is likely to move into the *endingerea* 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 the tsands 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 Rolf Marine Park Authority considers that traditional hunting and edoes 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): For turtle and dugong populations to exist in a healthy state, these impacts must be effectively managed and where necessary, prevented altogether.

Examples of turt products expoited in

overseas market

- 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 cyclone floods storms and predators.

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

Dugongs may become entangled in gill nets and shark nets.

Turtle and Dugong Conservation Strategy Issues Paper

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.



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 higlights. 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 algoritum on sand and mud flats.
- Abundant on the GBR, with major rookeries located in the Marine Park. These are islands of the Capticorn and Bunker Groups in the southern GBN (in particular North West, Wreck and Hoskyn Islands); and Raine Island, Moulter Cay, No 7 and No 8 Sandbacks in the northern GBR.
- There are two genetically distinct breeding populations on the GBR the northern GBR and the sorthern GBR.
- Breeding season: In the northern GDK 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 he 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 a 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 endersis to Australia. They have only been recorded nesting within continental shelf waters.
- The species is distributed throughout to pical that subtropical waters of northern Australia. They are abundant in Queensland waters, when they whabit shallow coastal waters and intercreefal toft bottom habitats, feeding in shallow turbid waters.
- Nesting principally occurs on the ceaches of inshore continental islands and the minland letween 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.

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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 aajor rookeries in the Marine Park located on the islands of the Capricorn and Bunker Groups, especially Weed, Tryok and Erskine Islands, and the cays of the Swain Reef. Nesting in the Region also occurs on the maxiland coast from Bundaberg to Round Hill, in particular at Non Repos and Wreck Rock beaches.
- Breeding season: Mating companyees 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.

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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 sizes 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 clitch, which incubate for approximately, wo conclus before the hatchlings emerge. There is no available information on the number of clutches per season, or low 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.



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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, desting only at the extreme north of the GBR. Nesting occurs all year round although a peak is evident from anuary to April. Recorded nesting on the GBR is largely on the inner shelf cays and islands, north of Princess Charlotte Lay. 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 boly has grey-bronze colouration, which is darked on the dorsal surface, than the ventral.
- Adult dugongs can grow to lengths creater than 3 m and weigh in excess of 400 kg.
- Despite their appearance, dupings 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 Sta in 1741, but previous populations had occurred all provide Pacific rim from Mexico to Japan. The entire estimated population of 2000 became entire by 1768 due to intensive hunting by seal to errs, 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.



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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', Organisation (QCFO);
- development of environmental standards by Oprovide 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), ODEH, CBRMPA and other agencies;
- long-term research into trawling and to ties, 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 or take of turtles and dugongs except by Aboriginals and Tyres Struit Islanders for traditional purposes;
- nevelophere by GBRMPA and QDEH, of cooperative management arrangements with Aboriginal and Torres Stait Lander groups to assist in managing the take of turks and dugongs for traditional purposes;
- esearch 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 three en the species and inadequate, but growing restard 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 specie



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 marke conservation matters.
- Queensland Department of Environment and Hernege 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 deleg ted to QDPI/QB&FP, in some matters. The Queensland Tish Management Authority exercises the dat-to alay 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 awarenes;
- establish a Turtle and Dugong Review Group to:
 review and advise on conservation and conagenerations, 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 provities; and

- devise and make recommendations roout 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
- QGFO
- Coar al development interests
- Conservation interests
- As riginal and Torres Strait Islander interests Research interests.

GOAL

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Turtle and Dugong Conservation Strategy

Issues Paper

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. Aboviginal, and Torres Strait Islanders, conservation groups, the commercial fishing industry management agencies and the general public.

The proposed strategies are outline cin the following tables.

STRATEGIES

Issue/Objective	Strategy	Mechanisms	Key Players	Timetable	Comments
1. Habitat Protection Identify and manage destructive human activities to protect	1.1 On the basis of scientific research and traditional knowledge, identify crucial turtle and dugong areas and their protection needs.	 Marine Parks and coastal rezonings. 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.
crucial habitats for turtles and dugongs.	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, OPEH, QDPI, A& SI 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.	QRM A, QDEH, QDA A&T I 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 GBR 415 QDEH and QD 4 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 unsuitably for the dumping of dredge spoil.	BRMPA and QUTH pramits, and public elations.	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 deviate length of shot time and net dimensions.	Codes of practice, ogulations 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 or emergency provisions to protect creas 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	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.
netting) to minimise the level of accidental capture and death resulting from the	2.2 Develop and promote the use of guidelines for turtle recovery post-trawl.	Liaison and public relations programs.	GBUMPA, QLUH, QDPI, DFMA and QCTO	Continuing	Voluntary compliance is essential. QCFO has information from international sources.
incidental capture of turtles and dugongs.	2.3 Legislate requirements if compliance with guidelines is inadequate within 18 months of introduction.	GBRMPA ar Queensland legislation.	GBRM PA, QDEH,	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, fi king industry and other sources.	Mass media, video and jub. 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 industa with maps indicating high sensitivity areas and advise on the avoidance on hese areas.	Public relations, onson, 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 Abstiginal and Torres Strait databler a pupe and the commercial fishing inducity to promote understanding of viewpoints and encouraging comboration in practices to protect turtles and dagongs.	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.

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3. Aboriginal and Torres Strait Islander Issues	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.
Establish cooperative management systems to locally manage use,	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.
conservation and preservation of turtles and dugongs and their	3.3 Integration of Aboriginal and Torres Strait Islander involvement in scientific research.	Public relations, liaison and codes of practice.	GBRMPA QDEL A&TSI, DPI and Researchel	1995	GBRMPA to develop the mechanisms.
habitats, whilst allowing for continuance of	3.4 Develop guidelines for researchers working with Aboriginal and Torres Strait Islander communities.	Guidelines and codes of practice.	C RMPA, QL V, N-TS and Researcher	1995	High researcher and A&TSI involvement is essential.
Aboriginal and Torres Strait Islander cultures.	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.	GBRM 14, QDEH, A&TSI and Notearchers	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, constantion and aocumentation.	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 of traditional hunting in conjunction with Aboriginal and Torres Strait Island r groups and researchers.	Research, consultation and attension.	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 Aborn inal and Torres Strait Islander Lunding a bas	Research, liaison and consultation.	GBRMPA, QDEH and A&TSI	Continuing	Action through zoning, liaison and cooperative management.
	3.9 Continue to receive the traditional knowledge and lore of Aborigitals and Torres Strait Islande, and coardal 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.

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4. Incidental Injury and Kills Significantly reduce	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.
the levels of incidental turtle and dugong injury and kills by boats, accidental capture, pollution, and the loss	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, AND A&TA, QDoTond Researchers	1995	Possible funding from the OR2000 and/or corporate funds, for strategies 4.2 and 4.3.
of habitat as a consequence of catastrophic events.	4.3 Develop, advertise and ensure compliance with guidelines for travelling in identified habitat areas.	Public relations campaign linked with research and tradition knowledge.	GPI MPA, 2DEH, 2DPI, ANCA, 22TS 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.	Reserve day-tu-day managery at and voluntee groups.	GBRMPA, QDEH, QDPI, A&TSI and Researchers	1995	Short and long term responses are needed.
·	4.5 Educate the public on the necessity advise management agencies of any accidental kills of turtles and durings.	Public relations, '008'; none number.	GBRMPA, QDEH, QFMA and ANCA	1994	Funding is required. Possible corporate sponsorship.
	4.6 Collate information on the sevel incidental mortality for turth, and dugongs.	Laison, 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	5.1 Estimate levels of height one 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.
community pressure, minimise illegal killing of turtles and dugongs.	5.2 Improve monitor be 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.

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6. Restoration Plans Develop and	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.
implement the means to restore degraded or threatened habitats and turtle and dugong	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.
populations.	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 Dugor Review Grow	Tu le 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 	7.1 Monitor issues and developments in state, national and international committees for species protection.	To be addressed by the Kox phyrers.	ANCA and QDEH	Continuing	GBRMPA would seek advice on developments from key players.
in the killing of turtles and dugongs in South Pacific and Asian countries through	7.2 Promote the development of recovery plans and conservation plans for tottles and dugongs using Great Barrier Reco Region and a test case.	1 be addressed by the vey players.	ANCA, QDEH and GBRMPA	1994	Ensure that GBRMP developments are reported to state and national committees.
representations to state, national and international committees.	7.3 Ensure representation of GBRMPA's position on state, national and international communees.	Turtle and Dugong Review Group.	GBRMPA, ANCA and QDEH	Continuing	Indirect representation through agencies and/or the Turtle and Dugong Review Group.
B. Encourage a commitmer by state, national and international agencies to protect and conserve	7.4 Encourage neign pouring nations to nt monitor and record outch straistics 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.
turtles and dugongs.	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.

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	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	9.1 Maintain consistent communication between GBRMPA and other management agencies, with regards to turtle and dugong conservation.	Develop a commitment be ween agencies to cose, consult and negotiate.	GERMPA, QDEH, DPI, 28&FP, A TH and ANCA	Continuing	Present levels of communication need to be further developed.
management agencies and with the public as a whole, concerning the conservation needs of turtles and dugongs.	9.2 Develop links and mechanisms for non- agency interests to contribute towards the turtle and dugong conservation strategy.	Develop commitmer decreen concievend public interest in liaise, consultand 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.
S H t t	9.3 Establish an awareness by the general public on the need for the conservation of turtles and dugongs, through by development of interactive education and information programs.	A Vication and Information programs: media, public displays and school programs.	GBRMPA, QDEH, QDPI, QB&FP, QCFO, ANCA, A&TSI, AMPTO 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.

